



FRIDAY, NOVEMBER 27.

Train Accidents in October.

The following accidents are included in our record for the month of October:

COLLISIONS.

REAR.

1st, very early, freight on New York, Lake Erie & Western ran into preceding freight near Turners, N. Y., wrecking several cars.
 2d, p. m., freight on Grand Rapids & Indiana ran into preceding freight near Kalamazoo, Mich., damaging 7 cars.
 3d, a. m., passenger train on Philadelphia & Reading ran into rear of coal train near Turkey Run, Pa., wrecking several cars. There was a dense fog at the time.
 4th, night, freight on New York, Lake Erie & Western, ran into preceding freight in Salamanca, N. Y., damaging several cars.
 4th, night, passenger train on Cincinnati, Indianapolis,

broke in two near Massillon, O., and rear section ran into forward one, wrecking several cars.

10th, a. m., freight on New York, Lake Erie & Western ran into preceding freight near Lackawaxen, Pa., wrecking 5 cars.

10th, a. m., coal train on Delaware, Lackawanna & Western ran into some cars broken loose from a preceding train at Big Flats, N. Y., damaging 2 cars.

10th, night, freight on New York, Lake Erie & Western ran into preceding freight near Goshen, N. Y., wrecking several cars.

11th, night, coal train on Lehigh Valley broke in two near Somerville, N. J., and rear section ran into forward one, wrecking 7 cars.

12th, night, freight on Northern Pacific ran into preceding freight at East St. Cloud, Minn., damaging several cars.

15th, a. m., freight on Denver & Rio Grande ran into preceding freight near Husted, Col., damaging several cars.

15th, night, freight on Louisville & Nashville ran into preceding freight, which had stopped at Glasgow Junction, Ky., wrecking 4 cars.

15th, night, freight on Western & Atlantic broke in two near Marietta, Ga., and rear section ran into forward one, wrecking several cars.

17th, a. m., passenger train on Hannibal & St. Joseph ran into preceding freight at Harlem, Mo., damaging several cars.

17th, night, passenger train on Central of New Jersey ran

21st, very early, freight on Pittsburgh & Lake Erie broke in two near Rock Point, Pa., and rear section ran into forward one, wrecking several cars.

21st, a. m., coal train on New York, Lake Erie & Western ran into cars broken loose from a preceding coal train near Goshen, N. Y., damaging several cars.

25th, a. m., freight on Pennsylvania Railroad ran into preceding freight near Edgewood, Pa., wrecking several cars and injuring a brakeman. There was a heavy fog at the time.

26th, night, freight on Louisville & Nashville ran into preceding freight at Goodlett, Tenn., damaging several cars and injuring 2 brakemen.

27th, night, passenger train on St. Louis, Iron Mountain & Southern ran into rear of freight near Hope, Ark., damaging 2 cars.

28th, night, freight on Galveston, Harrisburg & San Antonio ran into rear of preceding freight near Sierra Blanco, Tex., damaging several cars.

29th, a. m., passenger train on Central Vermont ran into switching passenger train in St. Albans, Vt., damaging 2 cars.

29th, p. m., freight on Albany & Susquehanna ran into rear of a gravel train near Harpersville, N. Y., damaging engine and 2 cars.

30th, night, passenger train on Pennsylvania Railroad ran over a misplaced switch into a freight on siding at Springdale, Pa., damaging several cars.

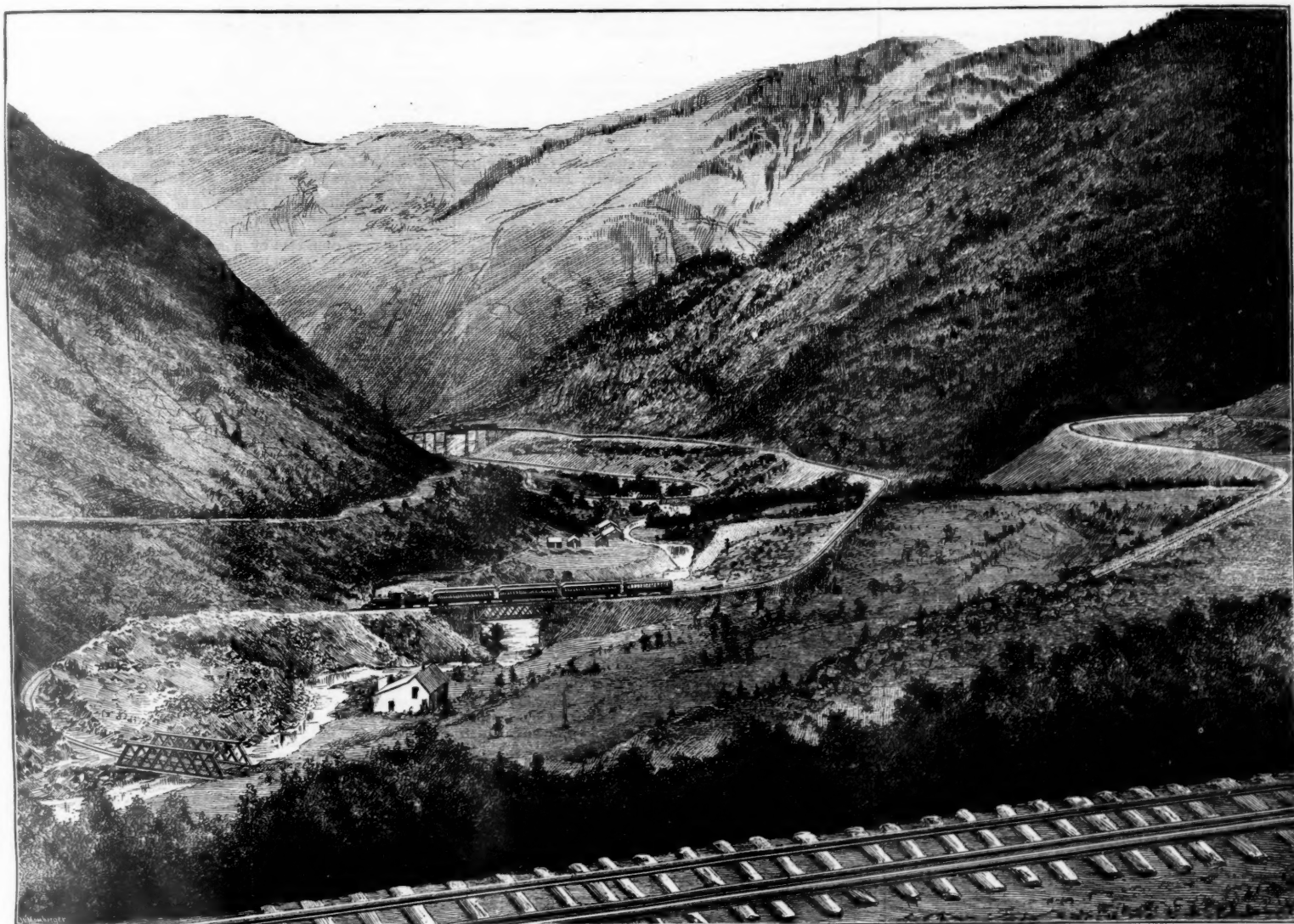


FIG. 1.—VIEW OF SPIRAL ON GEORGETOWN, BRECKENRIDGE & LEADVILLE RAILWAY, BETWEEN GEORGETOWN AND SILVER PLUME, COL.

(For Description see page 755.)

St. Louis & Chicago ran into some freight cars which had been run out of a siding near Indianapolis, Ind. Two cars were damaged.

5th, a. m., passenger train on New York, Pennsylvania & Ohio ran into a switching freight train in Meadville, Pa., damaging engine and 3 cars.

5th, a. m., passenger train on New York, New Haven & Hartford, ran into another passenger train going into a siding at East Hampton, Conn., wrecking a parlor car.

5th, a. m., wild engine on Texas Pacific ran into rear of freight near Ft. Worth, Tex., doing some damage.

6th, a. m., freight on Northern Pacific ran into preceding freight, which had stopped at Bluffton, Minn., wrecking 3 cars and killing a lot of cattle.

7th, a. m., freight on Pittsburgh, Ft. Wayne & Chicago ran into preceding freight near Leetonia, O., wrecking several cars, killing 1 trainman and injuring another.

7th, night, freight on Memphis & Charleston ran into preceding freight stalled on a grade near Burnsville, Tenn. Engine and 3 cars were wrecked, 1 trainman killed and 2 others badly injured.

9th, a. m., freight on Toledo, Columbus & Southern ran into pile driver standing on siding in Toledo, O. The shock threw the pile driver from the car over upon the locomotive, damaging it badly and injuring 2 trainmen.

9th, a. m., passenger train on Manhattan Elevated ran into preceding train near the Eighty-ninth street station, doing some damage. There was a dense fog at the time.

9th, p. m., freight on Central of New Jersey ran into preceding freight at Whitehouse, N. J., wrecking several cars. The wreck caught fire and 4 oil cars were burned up.

9th, night, freight on Pittsburgh, Ft. Wayne & Chicago

into rear of freight which had stopped at Cranford, N. J., damaging engine and 2 cars and injuring 5 passengers slightly.

18th, p. m., freight on Virginia Midland ran into preceding freight near Clifton, Va., wrecking several cars and killing a drover and injuring 2 other drovers and 2 trainmen.

18th, night, passenger train on Pennsylvania Railroad ran into emigrant train, which had stopped to coal at Meadows, N. J. The caboose and 1 passenger car of the emigrant were thrown over upon the other track, but not seriously damaged.

A moment later, before a signal could be sent out, a train coming up on the other track struck the passenger car, wrecking it completely. It was filled with emigrants, of whom 8 were killed and 9 injured, most of them seriously.

The wreck caught fire and 2 cars were destroyed. It is thought possible that 1 and possibly 2 persons were burned up in the fire.

The first collision was caused by the failure of the operator at the preceding block station to signal the express.

The second collision occurred so immediately after the first that no signal could have been sent out in time to stop the train which was coming up on the opposite track.

19th, a. m., freight on Lehigh Valley ran into coal train at Black Creek Junction, Pa., and engine and 40 cars were piled up in a bad wreck. There was a dense fog at the time.

19th, a. m., freight on Philadelphia & Reading ran into preceding freight near Annville, Pa., and the engine and 20 cars were piled up in a bad wreck. There was a heavy fog at the time.

19th, a. m., passenger train on Louisville, New Orleans & Texas ran over a misplaced switch and into a freight standing on a siding at Sauve, La., wrecking several cars and injuring a trainman and 3 passengers.

29th, night, passenger train on Cincinnati, Washington & Baltimore ran into some cars which had been blown off siding near Belpre, O. Engine and 2 cars were damaged and fireman hurt.

30th, a. m., freight on Atchison, Topeka & Santa Fe broke in two near Lawrence, Kan., and rear section ran into forward one, damaging several cars.

31st, a. m., coal train on Philadelphia & Reading ran into freight standing on a bridge near Williamsport, Pa., wrecking several cars. The bridge gave way and the engine and 5 cars fell into the creek.

31st, a. m., construction train on New York, New Haven & Hartford ran into preceding freight which stopped at Milford, Conn., wrecking caboose and injuring 6 trainmen. The freight had set back a signal, but not far enough.

31st, a. m., passenger train on Lake Shore & Michigan Southern ran over a misplaced switch and into a freight standing on siding near Elmore, O. The engineer was badly hurt.

31st, night, freight on Columbus & Western ran into preceding freight near Salem, Ala., wrecking engine and several cars, and injuring 2 trainmen.

BUTTING.

2d, a. m., butting collision between two freights on Valley Railroad near Cleveland, O., wrecked both engines and several cars, and injured a trainman.

4th, a. m., circus train on St. Paul, Minneapolis & Manitoba broke in two near Fergus Falls, Minn., and the detached cars ran down grade and into the head of the following section of same train. Three cars occupied by the circus men were wrecked, killing 5 and injuring 37 others.

6th, very early, butting collision between two freights on

Philadelphia & Reading near Easton, Pa., wrecked both engines and several cars, killing a brakeman.

9th, a. m., construction train on Erie & Wyoming Valley broke in two near Bunker Hill, Pa., and the cars ran back down grade and into a following coal train, doing some damage.

9th, night, butting collision between two freights on Louisville, New Orleans & Texas near Leland, Miss., damaged both engines and several cars and injured a trainman.

10th, p. m., butting collision between freight and wild engine on Baltimore & Ohio near Wheeling, W. Va., damaged both engines slightly.

The wild engine had been reversed and the engineer jumped off, and it started off backward and in a short distance attained a very high speed and ran into a freight coming up on the same track. Both engines were completely wrecked, killing an engineer and injuring a fireman.

10th, a. m., butting collision between two freights on New York, Lake Erie & Western, near Southport, N. Y., damaged both engines and several cars.

13th, a. m., butting collision between passenger and coal train on Philadelphia & Reading, near Big Mountain, Pa., wrecked both engines and several cars.

13th, a. m., butting collision between freight and construction train on Michigan Central, near Galesburg, Mich., damaged both engines and several cars.

18th, early, butting collision between passenger train and freight train on Boston & Lowell, near West Andover, N. H., wrecked both engines and several cars, killing 3 trainmen and injuring 5 others. The freight train had gone back after some cars which had broken loose, leaving word at West Andover to hold the passenger train there, but the people at the station neglected to do this.

20th, p. m., butting collision between two passenger trains on Philadelphia & Erie, near Williamsport, Pa., wrecked both engines and 2 cars. Two trainmen were killed and 2 trainmen and a passenger hurt. The accident was caused by the failure of the engineer of one of the trains to observe the signal. He was prevented from seeing it by a blinding storm which prevailed at the time.

24th, a. m., freight on Elmira, Cortland & Northern broke in two near Van Etten, N. Y., and the detached cars ran back down the grade and into a following freight. Engine and several cars were wrecked, 2 trainmen killed and another badly hurt.

CROSSING.

18th, a. m., Grand Trunk freight ran into Michigan Central freight at the crossing in Canfield, Ont., damaging engine and 5 cars and injuring the engineer.

19th, a. m., New Jersey Southern passenger train ran into Pennsylvania Railroad passenger train at the crossing in Toms River, N. J., damaging several cars.

23d, night, Chicago, Rock Island & Pacific freight ran into Chicago, Burlington & Quincy freight at the crossing in Council Bluffs, Ia., damaging several cars.

DERAILMENTS.

BROKEN RAIL.

2d, very early, passenger train on Intercolonial struck a broken rail near Canaan, N. B., and 3 cars were thrown from the track, injuring 2 passengers. One of the passenger cars was set on fire by the stove and destroyed.

8th, night, passenger train on Wabash, St. Louis & Pacific struck a broken rail near Worth, Ill., and the engine was upset and the engineer slightly hurt.

14th, a. m., passenger train on Wabash, St. Louis & Pacific was derailed near Kirksville, Mo., by broken rail. The conductor was hurt.

14th, night, freight on Alabama Great Southern was derailed near Rising Fawn, Ga., by broken rail, and 13 cars were wrecked.

15th, a. m., passenger train on Northern of New Jersey was derailed at Nordhoff, N. J., by broken rail, damaging engine and 1 car.

15th, a. m., engine of construction train on Philadelphia & Erie was derailed near Renovo, Pa., by broken rail, and the engine went down the bank with 3 cars after it, injuring 3 laborers badly and 3 slightly.

17th, night, freight on Lake Erie & Western was derailed in Fostoria, O., by broken rail.

24th, a. m., passenger train on Wabash, St. Louis & Pacific struck a broken rail near Laporte, Ind., and the rear car was thrown from the track and upset.

29th, very early, passenger train on Gulf, Colorado & Santa Fe was derailed near Alvarado, Tex., by broken rail and the caboose fell from a bridge, about 17 ft., injuring a brakeman and 5 passengers who were in it.

BROKEN FROG.

23d, a. m., freight on Cincinnati, Richmond & Ft. Wayne was derailed at Walkerville, Ind., by broken frog.

BROKEN BRIDGE.

29th, night, passenger train on Richmond & Allegheny went through a bridge near Balcony Falls, Va., and the whole train went into South River. Three trainmen were killed. The abutments of the bridge had been washed out by a freshet.

SPREADING OF RAILS.

1st, p. m., passenger train on Vicksburg, Shreveport & Pacific was derailed near Delta, La., by spreading of the rails. One car upset and was badly broken, injuring a trainman and 12 passengers.

7th, a. m., freight on Texas & Pacific was derailed near Mineola, Tex., by spreading of the rails. Two trainmen were hurt.

16th, night, 4 cars of freight on Gulf, Colorado & Santa Fe were derailed near Cameron, Tex., by spreading of the rails.

15th, p. m., freight on Northern Pacific was derailed at Aitken, Minn., by spreading of the rails, and 2 tramps were killed.

28th, night, freight on Wabash, St. Louis & Pacific was derailed near Sullivan, Ill., by spreading of the rails. A brakeman was hurt.

30th, a. m., freight on Gulf, Colorado & Santa Fe was derailed near Duncanville, Tex., by spreading of the rails, wrecking 9 cars and injuring the engineer.

30th, a. m., engine of freight on Marietta Mineral road was derailed near Cutler, O., by spreading of the rails.

30th, night, freight on Texas Trunk was derailed near Dallas, Tex., by spreading of the rails.

BROKEN WHEEL.

9th, a. m., several cars of freight on New York, Lake Erie & Western were derailed near Garfield, N. J., by broken wheel.

10th, a. m., engine of freight on Fall Brook Coal Co. road was derailed near Geneva, N. Y., by broken wheel.

30th, night, 5 cars of freight on Chesapeake & Ohio were derailed near Lexington, Ky., by broken wheel.

BROKEN AXLE.

15th, noon, construction train on Boston & Lowell was derailed near Carltonville, Mass., by broken axle.

21st, early, freight on Pennsylvania Railroad was derailed near Huntingdon, Pa., by broken axle.

22d, a. m., freight on Hannibal & St. Joseph was derailed near Arnold, Mo., by broken axle.

24th, night, 15 cars of freight on Philadelphia & Reading were derailed near Wernersville, Pa., by broken axle. A brakeman was killed.

25th, night, freight on New York, Lake Erie & Western was derailed in Hornellsville, N. Y., by broken axle.

30th, a. m., freight on Intercolonial was derailed near Riviere Ouelle, Que., by broken axle.

30th, p. m., freight on Chicago, Milwaukee & St. Paul was derailed near Westport, Dak., by broken axle.

BROKEN TRUCK.

1st, a. m., freight on New York, Lake Erie & Western was derailed near Pt. Jervis, N. Y., by broken truck.

BROKEN BRAKE-BEAM.

15th, night, freight on New York, Lake Erie & Western was derailed near Elmira, N. Y., by broken brake-beam dropping on the track.

17th, night, passenger train on Texas & Pacific was derailed in Ft. Worth, Tex., by broken brake-beam falling on the track.

BROKEN TRAIN.

28th, night, freight on Louisville & Nashville broke in two in Nashville, Tenn., and the rear section ran down a steep grade upon a siding, ran through the siding, off the end and across the street into a house, knocking down one side of it.

ACCIDENTAL OBSTRUCTION.

13th, a. m., passenger train on Baltimore & Ohio struck a rock which had fallen on the track near Ohio Pyle, Pa., and the engine and three cars were derailed. A fireman and 2 passengers were hurt.

CATTLE.

7th, night, freight on International & Great Northern was derailed near Minneola, Tex., by running over a cow, and 2 employes were hurt.

8th, a. m., construction train on Central Vermont ran over a horse near West Farnham, Que., and the engine was derailed, injuring engineer and fireman.

20th, night, passenger train on Chicago, St. Louis & Pittsburgh ran over a horse near Sharpville, Ind., and engine and 2 cars were derailed.

WASH-OUT.

12th, very early, passenger train on East Tennessee, Virginia & Georgia ran into a wash-out near Jesup, Ga., the engine and 2 cars going down and injuring 3 trainmen.

MISPLACED SWITCH.

15th, a. m., passenger train on Ohio & Mississippi was derailed at North Bend, Ind., by misplaced switch and a baggage car wrecked, killing a trainman and injuring a passenger.

17th, a. m., passenger train on Grand Trunk was derailed in Woodstock, Ont., by misplaced switch.

20th, night, freight on Cincinnati, Hamilton & Dayton was derailed at Carlyle, O., by misplaced switch.

30th, p. m., coal train on Philadelphia & Reading was derailed near Port Richmond, Pa., by a misplaced switch and 20 cars were piled up in a bad wreck.

31st, a. m., freight on Pennsylvania Railroad was derailed at Pine Creek, Pa., by misplaced switch. The fireman was badly hurt.

31st, night, freight on Burlington, Cedar Rapids & Northern was derailed at Northwood, Ia., by a misplaced switch. The engine and several cars were wrecked, 2 trainmen killed and 15 badly hurt.

RAIL REMOVED FOR REPAIRS.

6th, p. m., passenger train on Hannibal & St. Joseph was derailed near Wither's Mill, Mo., where some section-men had taken up a rail and failed to put out a proper signal. A passenger who was standing on the platform was killed.

29th, a. m., freight on Cleveland & Marietta was derailed near Oldham, O., where some section-men had taken up a rail and neglected to put out a proper signal. The engine and several cars were wrecked and the engineer hurt.

MALICIOUSLY CAUSED.

12th, p. m., locomotive of passenger train on Troy & Boston was derailed near Melrose, N. Y., by a tie which had been laid across the track.

30th, night, freight on Norfolk & Western was derailed in Petersburg, Va., by a switch which had been purposely misplaced.

UNEXPLAINED.

11th, night, freight on Northern Pacific was derailed near Cheney, Wash.

18th, a. m., freight on Vandalia Line was derailed near Terre Haute, Ind.

18th, very early, coal train on Erie & Wyoming Valley was derailed near Maplewood, Pa.

15th, a. m., freight on Baltimore & Ohio was derailed near Sandy Hook, Md., damaging the engine and injuring the fireman.

18th, a. m., freight on Kansas City, Springfield & Memphis was derailed near Jonesboro, Ark., and 4 cars were damaged.

20th, night, freight on Missouri Pacific was derailed near Humboldt, Kan., and a trainman hurt.

25th, night, several cars of freight on Chicago & Northwestern were derailed at Missouri Valley, Pa., and a brakeman killed.

OTHER ACCIDENTS.

BOILER EXPLOSION.

15th, a. m., engine of local passenger train on International Great Northern exploded its boiler near Henderson, Tex., wrecking the engine completely.

BROKEN PARALLEL ROD.

2d, a. m., engine of passenger train on Pennsylvania Railroad broke a parallel rod when near Curtin, Pa., damaging the engine considerably.

3d, p. m., engine of passenger train on Pennsylvania Railroad broke a parallel rod when near New Hanover, N. J., and the loose end tore a large hole in the boiler. The engine was very badly damaged and the engineer badly and the fireman slightly scalded.

MISCELLANEOUS.

13th, a. m., engine of freight on Pennsylvania Railroad broke a driving wheel when near Huntington, Pa., but was not derailed.

21st, night, freight on Missouri, Kansas & Texas caught fire when near Pittsburgh, Tex., and 7 cars loaded with cotton were destroyed.

25th, a. m., two cars of freight on New York Central & Hudson River caught fire when near Manhattanville, N. Y., and were destroyed.

SUMMARY.

This is a total of 123 accidents, in which 36 persons were killed and 134 injured; an increase of 18 accidents as com-

pared with October of last year, but a decrease of 3 killed and 37 injured.

The ten months of the current year to the end of October show a total of 1,047 accidents, 257 killed and 1,279 hurt; an average per month of 105 accidents, 26 killed and 128 injured.

A fuller statement of the totals and averages, with a summary of the causes, will be found on another page.

The Daft Electric Motor.

On Wednesday evening of last week (Nov. 18), a trial trip of this motor was made on the Ninth Avenue line of the New York Elevated Railroad, carrying a number of citizens who had been invited to witness the performance, from Fourteenth to Fifty-third street and back. Among these were some 30 members of the American Society of Civil Engineers, and at the meeting of the Society that evening Mr. Robert L. Harris gave, in substance, the following account of the working of the motor at Baltimore:

The Baltimore & Hampden Railroad is a suburban line of about two miles in length; gauge, 5 ft. 4½ in. It was heretofore an old horse railroad, and is a feeder to a main line of the Baltimore horse railroads. It is now operated by the Daft motors.

This road has iron rails (25 lbs. per yard) laid on cross ties in a cheap manner, and runs along the side of suburban streets or roads. The country is undulating and the route is crooked. Its curves are from 40 ft. to 90 ft. radius and the grades are from level to the rate of 330 ft. per mile. The superintendent, Mr. T. C. Robbins, says there are only about 300 ft. of continuous level on the route, and very little level on its entire distance.

A 25 lb. steel rail has been placed on insulators near the middle of the ties as conductor, and was roughly guarded by joists and planks laid on each side of it. The reason for using 25 lb. rails as conductors was simply that in case of failure they would be useful for repairs. It was unnecessarily large for a conductor. Electricity has been used upon the road in place of horses since Sept. 1, 1885. The sections of conducting rail, as also of the track rails, are electrically connected by wires. In some places these wires are not insulated, and the rails were connected by a mere loop of ¼ in. copper wire. The connections at main dynamo are of ½ in. copper wire insulated.

At the cheap engine house there is a boiler (two doors to the fire-box) 14 ft. long, 5 ft. diameter, with sixty 3½ in. flues. The engine is 16 x 24 in. cylinder, which, with 30 lbs. of steam, at 110 revolutions per minute, is said to develop about 75 horse power.

This engine drives two nominal 50 horse power Daft dynamos, which supply the electric current to the rail. The engineer said that when both motors, each with a loaded car attached, were ascending the steepest hills, the full capacity of his engine was used, but when neither were on a hill not 10 horse power was used. This engine uses about 1½ tons of coal per day of 18 hours, with fires banked at night.

Two motors are in use, each weighing about 4,500 lbs. and rated at 10 horse power. A new motor, weighing about 5,000 lbs., and rated at 20 horse power, has just arrived, and was connected with the current and moved about.

The fast motion of the armatures (stated as about 1,200 revolutions per minute) was geared to the driving-axle of the motor by ordinary tooth-gearing wheels in the proportion of 12 to 1, and the speed of the motor arranged for 12 miles an hour. But one strength of current has thus far been used, of low intensity; there has been no occasion for other powers of current. No electric brake is being used.

We rode on a regular trip to the end of the road and back with a street car attached, such as is ordinarily used with two horses. The average load was about 18 passengers. We went around one curve of 40 ft. radius on a grade of 275 ft. per mile, and around a curve of 70 ft. radius on a grade of 330 ft. per mile. While we were ascending a grade of about 320 ft. per mile, the other motor was said to be at the same time ascending a similar grade. We stopped near the middle of this grade, and started from full stop without difficulty. The toothed gearing made some noise, but passing horses did not seem frightened. It is expected to avoid toothed gearing by friction gear. The motors are controlled by one man, and, with car attached, start from each terminus about once an hour, and pass each other by side track.

Mr. Robbins told me that the "Morse" has run 1,006 miles with no repairs (except oiling). Its average duty is 75 miles per day. No special skill is needed; he had at times run his motors with men taken right off the road. He is satisfied with this power, and hopes that his company will soon use it on other six miles of suburban road which it owns. His company owns also 14 miles of Baltimore city horse railroads. He considers that his present power would run on his road five motors, each carrying one car, and were there but 150 ft. grades on his road, his present power would run five motors with three cars each. As now run the two motors take the place of 30 horses and are as cheap, and were he running eight cars there would be a saving of one-half the cost of horses for the same duty. There has been no trouble in heavy rain and thunder storms; he thinks it works better in wet weather, and has even known the flange of the conducting rail to be in water for a short distance during a rain storm.

He says two of the men that have run the motors were locomotive engineers, and their expression was, "It lays away over steam." In fact, he thinks steam would not, with such light engines, carry such loads up such grades as has been done by the motors. Mr. Robbins states that he has had no troubles other than mechanical, which are now remedied (the armatures and brushes were at first too light).

As a test for himself, Mr. Robbins once sent to the city for one of their heaviest cars..... 5,100 lbs. And carried a load of 81 persons over the road (say 81 x 125 lbs.)..... 10,125 lbs. The weight of the motor used was..... 4,500 lbs.

Thus, he says that 19,725 lbs. were carried over the road by one motor, of..... 4,500 lbs. His engine and boiler cost, approximately..... \$2,400 His two motors cost, approximately, \$3,000 each..... \$6,000..... \$8,400

There is also the expense of conducting rails and wires, insulation, protection, etc.

His expense of running per day is 1½ tons soft coal..... \$4 75 Engineer and fireman, at power station..... 4.50 Or, excepting oil, waste, wear and tear..... \$9 25 per day.

The above represents the cost of his power and equals the work of 30 horses per day.

The average receipts from the cars, carried by the two motors, are \$16 per day, and he has taken (on a Sunday) total receipts of \$86 in one day.

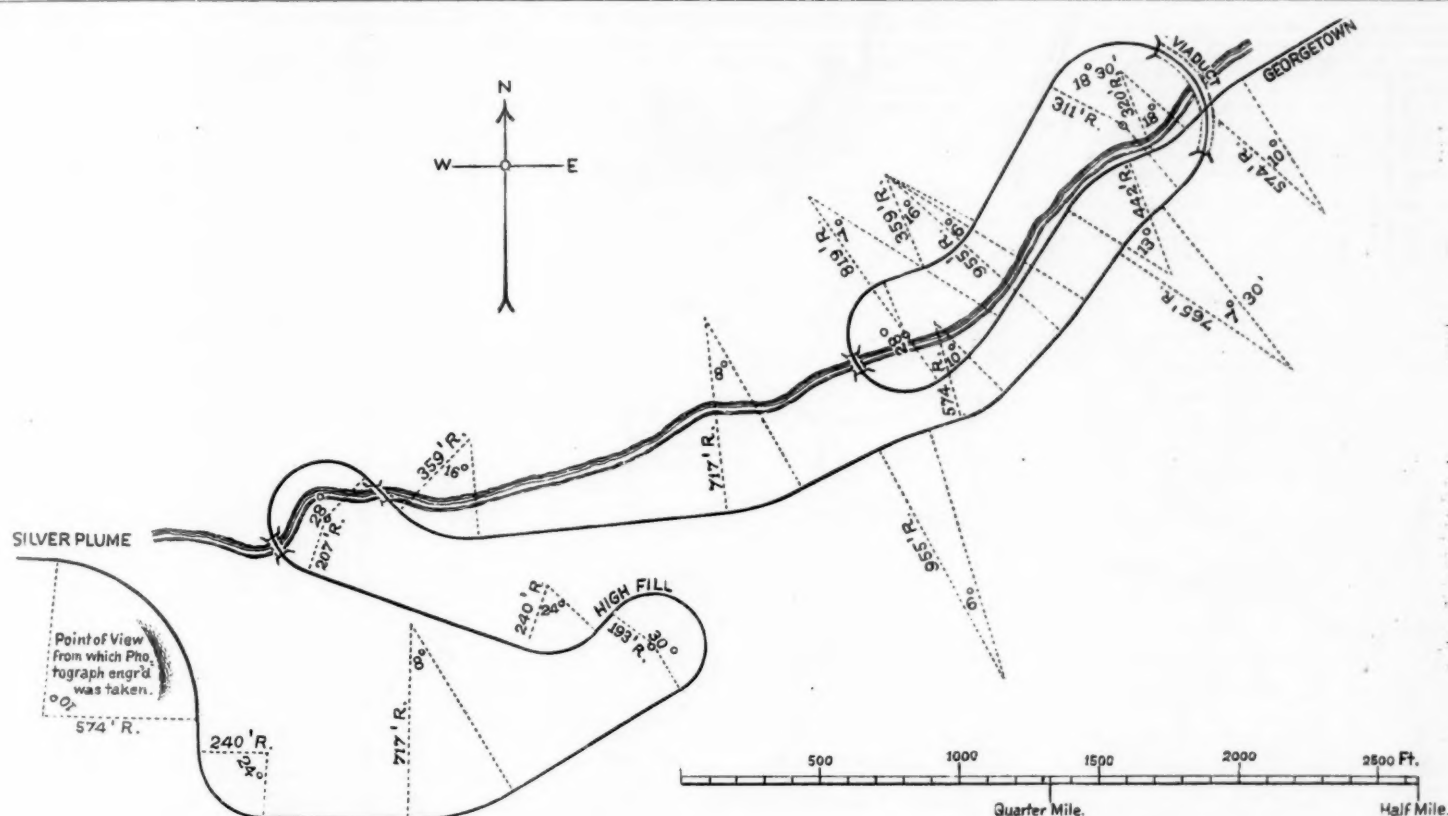


FIG. 2.—MAP OF ALIGNMENT OF GEORGETOWN, BRECKENRIDGE & LEADVILLE RAILWAY, SHOWN IN FIG. 1.

Calling the gross weight of train in the above record 10 tons, or 20,000 lbs., this performance was as follows :

| | |
|---|-------|
| Rolling friction, say 14 lbs. per ton | Lbs. |
| Grade resistance, say 6 p. c. grade (317 ft. per mile) | 140 |
| | 1,200 |
| Total tractive pull exerted ($6 \times 20 \times 10$) | 1,340 |
| Total weight on drivers of motors | 4,500 |
| Then $\frac{1,340}{4,500} = 0.298$, or about 0.30, adhesion. | |

The usual adhesion of a heavy locomotive is from 0.25 ($\frac{1}{4}$) to 0.35 (over $\frac{1}{3}$) of the weight on the drivers, 1% being not difficult to obtain under favorable conditions. This, however, is with a heavy load per wheel. For so light an engine the adhesion is very high, but may have been helped out somewhat by adhesion, without accepting the claim that the electric current appreciably increases the adhesion.

Railroad Spirals.

A spiral, or to speak with more geometric propriety, a *helix*, is a device for gaining distance on heavy grades by which the line in descending is turned back upon itself and crosses under itself at a lower elevation. It has always been a rare feature in railroad location, and it is only in very recent years that it has existed. The nearest to a proper name for one, geometrically, would be "helix," but spiral is a more usual term, and, since no geometrical name can be exactly applicable, is as good as any. The simple term "loop" is quite frequently used, but the latter is the only available term to designate U-like or elongated horseshoe bends in the line, like 3 and 4, fig. 5, and is commonly used for that purpose.

Spirals may be divided into two classes: "Tunnel spirals," or those where the line winds around (or into) a hill or a mountain, and then passes under itself in a tunnel, and "bridge spirals," or those which cross a valley or depression by a bridge, returning backward upon the opposite slopes of the valley and gradually descending into it, until the line passes under itself beneath a bridge or viaduct over which it has just passed.

All spirals must of necessity belong to one or the other of these classes, and the former is by far the most common, if anything can ever be said to be "most" common which is very rare. We illustrate in fact the only bridge spiral which is known to exist in any part of the world in figs. 1 and 2 herewith, and in figs. 3 and 4 show the only other one which is known to be located and in process of construction.

The spiral illustrated in figs. 1 and 2 is on the Georgetown, Breckenridge & Leadville Railway, now owned and operated by the Union Pacific Railway, between Georgetown and Silver Plume, Col. The line was first located in the summer of 1879, by Mr. J. Blickensderfer, the present Chief Engineer of the Union Pacific Railway, at the time when the Union Pacific expected to build a short line into Leadville from Denver, and is on the extension of the Colorado Central Railroad from Denver to Georgetown. Nothing, however, was done toward construction until the winter of 1881-2. The contract for construction of the first $8\frac{1}{2}$ miles was then let to Messrs. Langhorne & Ballard, and Mr. Robert B. Stanton took charge of the work as engineer. He made a complete revision of the location, and while the idea of the spiral, or loop, is just as it was, the details of the alignment have been greatly modified. The grades on and in the vicinity of the spiral, shown in part in fig. 2, are almost continuous at 155

ft. per mile ($8\frac{3}{4}$ per cent.) for the first four miles, being equated 0.03 per 100 ft. per degree of curvature. The maximum curve is 30 degrees, or 193.2 ft. radius, and in one instance there are 210 degrees in one curve. The gauge is 3 ft. The bridge crossing the creek and road is 90 ft. above the water and 75 ft. above the lower track.

The spiral will be seen to be laid out with very sharp (28 degrees) curves, and the line is a good illustration of the fact that the use of sharp curves in difficult country not only effects a direct saving, but makes possible lines and grades which would otherwise be wholly out of the question. The heroic treatment of the Gotthard road, shown in fig. 5, is possible indeed anywhere, but for a line such as in Colorado, where such defiance of difficulties is financially out of the question, the indirect advantage of the sharp curvature is the chief one.

The quantities for the $8\frac{1}{2}$ miles of work, which includes the spiral, are, in round numbers: Earth, 243,000 cubic yards; loose rock, 44,000 cubic yards; rock, 55,000 cubic yards; masonry, 8,500 cubic yards, and total cost of grading and masonry was \$235,500, or \$26,500 per mile. The iron bridge, by which this line crosses itself, is on an 18 degree 30 minutes curve (311 ft. radius), and was built by Kellogg & Maurice, now of the Union Bridge Co.

The air-line distance from the foreground of fig. 1 to the bridge is a little over three-quarters of a mile, while the distance between the two points by the line (to where the line passes under the bridge) is 2.36 miles, of which the spiral itself is 0.71 mile.

The other spiral illustrated is on a much larger scale, but has not yet been constructed. It is on the lower end of the Pacific Branch of the Mexican Central Railway, on the descent from the city of Tepic to the coast flats, work on which has been recently suspended before construction had reached the spiral. It was located by Mr. A. M. Wellington, Assistant General Manager in charge of location, the late Mr. Edward Yorke, Chief Engineer of the Pacific Branch, being in immediate charge of the surveys of the branch. Several efforts were made by various engineers to obtain a practical line, which are distinguished as first, second, and third lines in fig. 4 herewith, but without any very satisfactory result, until, aided by the knowledge gained in the previous surveys, the idea of the spiral line was conceived and pushed to a successful completion, with a reduction of considerably over half in the estimated quantities of the line.

The spiral line, as finally completed, furnished an instructive example of the extent to which natural difficulties may be avoided by first selecting a place where a *portion* of the line can lie to good advantage, wherever it may be, and adapting the remainder of the line to it. The conditions, briefly stated, were these :

The town of Tepic is at an elevation of 915 metres, or 3,035 ft., above the sea, and distant only some 17½ miles east therefrom, half of which is a dead flat rising but a few feet above the sea, so that the entire rise would have had to be made on a direct route, within an air line distance of some nine miles. Descending from Tepic (see fig. 4), the line first follows the valley of the Tepic River until it diverges therefrom (as it flows in an entirely wrong direction and becomes impractically rough) and strikes across into the valley of the smaller Ingenio River at the Rincon Pass, marked "controlling summit" on fig. 4, at an elevation of 2,508 ft. (795 metres) above the sea.

Up to this point the descent was on less than a 2 per cent. grade and offered no difficulty, although requiring some heavy work and affording views of great sublimity and beauty over the rugged and abrupt descent to the coast flats.

In descending from this controlling pass into the valley of the Ingenio River (which is the long stream in fig. 4 which the line follows below the spiral), the usual difficulty was encountered, that the first descent was exceedingly sharp. In an air-line distance of two miles, from the controlling summit to the lower left-hand corner of the spiral in fig. 3, there was a descent of some 490 ft. Moreover, the valley of the Ingenio, while entirely practicable for a line in or very near to the bed of the stream, had, for many miles below the spiral (to near *B*, fig. 4) abrupt and rugged banks several hundred feet high, of the same impracticable character as those shown immediately below the spiral bridge, fig. 3, although below *B* the valley became more tractable.

Under these circumstances, since it was impossible to descend into the bottom of the valley on any practicable grade, and since, unless this were done, the line must be, for a long distance below the spiral afterward adopted, entirely above the immediate slopes of the valley to avoid the most excessive work, a comparatively light trial grade, 2 per cent., was not unwisely adopted for running the three first lines shown by dotted lines on the map. These lines, otherwise differing from each other greatly, agreed in swinging around the area covered by the spiral and close to the latter, although off the area covered by the map in fig. 3. To trace them on the map of the spiral, start from near the scale and title and pass thence to the right, then down, and then, at the bottom of the map, to the left, to a point between *A* and *B* on the small-scale map, fig. 4. At this point they were already far above the grade of the spiral bridge, so that they soon left the excessive slopes of the valley and struck comparatively easy work on the narrow ridge lying between the valleys of the two parallel streams shown.

Nevertheless, the work on all three of the lines was excessive, while the low grade required a great amount of otherwise unnecessary development and curvature. Two of these lines were located on paper and profiles made, but no accurate estimates were ever made of them, as the work was very forbidding, involving, in spite of the use of 17 degree curves, a number of tunnels and many retaining walls and small viaducts.

These facts made it clear, if it had not been before, that the attempt to find a line by starting from the summit as a controlling point and letting it fall thence where it would, must be abandoned, and a line lying *in the bottom of the valley* as a fixture and worked from at each end; that being the only place where a really economical line could lie for the entire distance down to *C*, fig. 4, and in a measure down to *D*. The result goes far to prove the utility and necessity of this plan of locating really difficult descents which are measured by thousands instead of hundreds of feet.

A random line in the bed of the stream showed that a 2.6 per cent. grade (137 ft. per mile) was the lowest adapted to it, and in assuming the line to be in this position and extended from each end; (i. e., conceiving the line fixed *under* the bridge in Fig. 3) the ascent thence up the upper small stream was (for the country) mere surface work, and the extraordinarily favorable point for the high crossing (the narrowest for miles) naturally suggested sweeping the line around, through a deep but narrow cut into the lower small valley, so

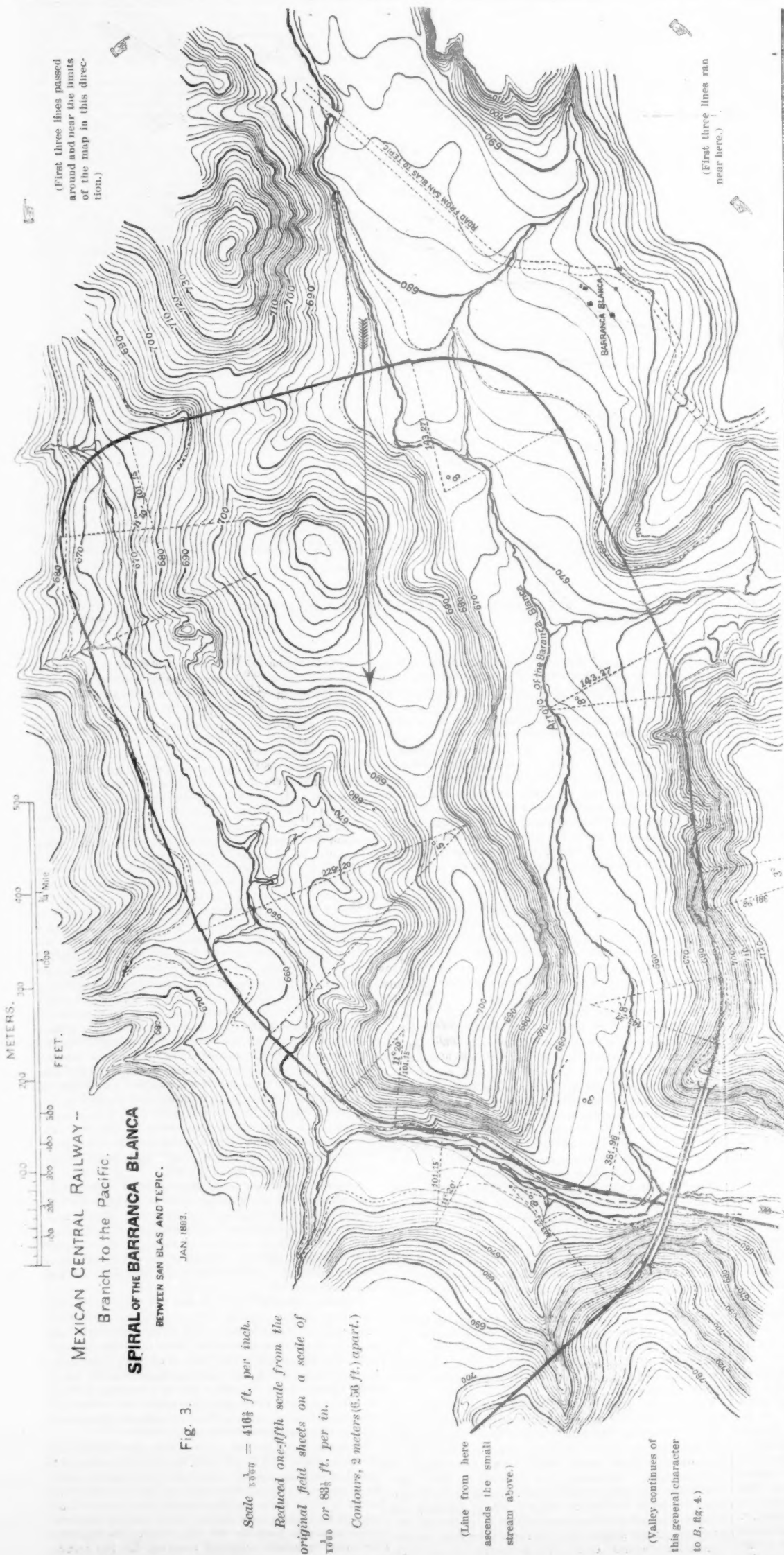


Fig. 3.



as to cross over itself by a high viaduct, and thence ascend to the summit. Above the viaduct it follows up the right slope of the small stream shown just under the title, being on the opposite side from the three previous lines, which chanced also to be somewhat the best side.

It was found on extending the line up to the summit that it left some spare elevation, and this was properly concentrated within the spiral, in order to make the bridge as low as possible, although doing this had its painful side to the engineer, as the topography readily admitted of an unbroken grade within the spiral and some 50 ft. more rise, with even lighter work both within and above the spiral, except that the viaduct would have been higher. Its length and cost, would have been very slightly increased, but enough to make it inexpedient.

The leading dimensions of the spiral and viaduct are as follows:

Length of spiral, 2,637 metres..... = 8,652 ft. = 1.64 miles
(405 + 60 = 609 + 30, with 10 metre stations).
Descent in spiral, actual..... 53.00 metres = 173.9 ft.
do. on 2.6 grade 68.56 "

Loss of elongation in do..... 15.56 "

Utilized as follows:

For curve compensation, 303 deg. (at 0.06 per degree)..... 5.56 "
Spare elevation, utilized for a station ground and water station at south end of spiral..... 10.00 "

Viaduct: Length, 200.0 metres..... = 656 ft.
Height, 53.0 = 173.9 "

The height is above the grade line. Above low water it was some 7 ft. more.

The material to be banded was not rock, as might be inferred from the excessive slopes (which are rarely as flat as $1\frac{1}{2}$ to 1), but in part *tepetate*, a kind of volcanic tufa of the hardness and color of very soft-baked clay, found in vast masses in all parts of Mexico, so that it constitutes on many long stretches of railroad nearly all the material moved below a thin soil; and in part *jal*, which consists of thick sand-like deposits of little particles of pumice-stone of the size of a pea or bean, as white as snow; whence the locality derived its name of *Barranca Blanca* or white gulch. *Jal*, though perhaps the lightest of known materials, holds, like *tepetate* a very steep slope when protected from wash. Neither *jal* nor *tepetate* exist in any part of the United States or (so far as known) Europe, so that there is no English name for them.

The dotted grade-line on fig. 3 will enable the character of the work to be seen at once. The contours are two metres ($6\frac{1}{2}$ ft.) apart and along the line are minutely accurate. Owing to the excessively steep slopes on or near to the line, it was located with a view to doing most of the grading by large earth (*tepetate*) blasts, which will explain the way in which the line is laid at certain points. Rock crops out above and below the spiral to a considerable extent, being in all cases basaltic lava, with which the whole country is underlaid, but not on the spiral itself, so that its cost was even less per mile (exclusive of the bridge) than the average of the line. The bridge itself was estimated to cost in the neighborhood of \$50,000, which perhaps was too low.

The cost per mile of various sections of the road was estimated to be as follows, at about the usual American prices; the sums given include earth and rock grading and masonry only. There were no tunnels, but some eight or ten small iron bridges or viaducts:

| No. of Miles. | Locality. | Cost per Mile. |
|---------------|---|----------------|
| 10. | From Controlling Summit to and past the spiral..... | \$14,630 |
| ABOVE SPIRAL. | | |
| 8. | First below Tepic..... | 16,080 |
| 5. | From Escondida to Rincon Pass..... | 58,900 |
| BELOW SPIRAL. | | |
| 11. | First below spiral..... | 14,700 |
| 10. | To near B, fig. 4..... | 13,120 |
| 7. | Near B, past C..... | 30,800 |
| 1. | Up past D to limit of map..... | 21,800 |

At the limits of the map, fig. 4, the line is still some 20 miles from the coast, but only some 75 ft. above it, and the difficulties are over. It will be seen that the section, including the spiral and line in the vicinity, is among the cheapest on the descent, where before it had run for many miles over \$120,000 per mile for grading and masonry only. The most costly work was on the three miles passing from one valley to another. The limit of curvature was 17 degrees (foot system)—11 degrees 20 minutes metric, for 20 metre chains).

Of tunnel spirals, the greatest in the world by far are those on the Gotthard Railroad, outlined in fig. 5, of which there are five, with two loops, properly so-called, 2 and 3, fig. 5, of the same general nature. They may well be called "tunnel" spirals, for the line not only passes under itself by tunnel, but has the whole spiral in tunnel; the line, when in ascending, it struck the bottom of the valley, having been boldly turned into it, and a circular helicoidal tunnel cut (termed on that line a "rising curve"), emerging above itself at a higher elevation. These, among the other grand features of the line, were fully described and illustrated in our issue of Sept. 10, 1880.

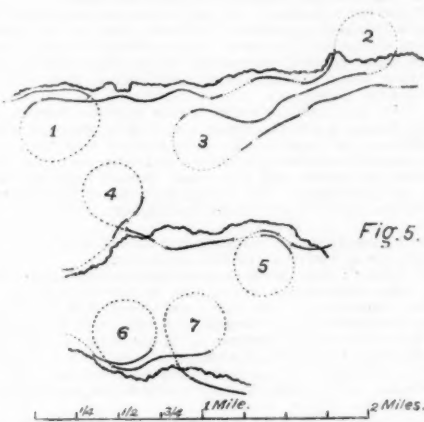
On this line the maximum tangent grade was 2.5 to 2.7 per cent. (132 to 142 ft. per mile), reduced in tunnels and on curves to 2.3 per cent. (121½ ft. per mile), and the minimum radius was 920 ft. (6 deg. 8 min.). The details of the five spirals and two loops are as follows:

| No. Descrip- fig. 5. tion. | Elevation gained ft. | Length of tunnel Feet. | Deg. |
|-------------------------------|----------------------------|------------------------------|-------|
| 1... Spiral... | 172 | 5,000 | 245 |
| 2... Loop... | 426 | 3,570 | 210 |
| 3... "..... | | 3,605 | 210 |
| 4... Spiral... | 160 | 5,100 | 260 |
| 5... "..... | 191 | 5,010 | 270 |
| 6... "..... | 290 | 4,900 | 280 |
| 7... "..... | 320 | 5,010 | 280 |
| | 1,298 | 32,195 | 1,735 |

The radii vary from 920 ft. up, being for the most part 985 ft. (5 deg. 49 min.). Allowing 960 degrees to each spiral,

there are in all, 2,520 degrees, of which a trifle less than 70 per cent. is in tunnel. This makes the total distance gained by the spirals proper, some 46,200 ft., or 8¾ miles, an average length of 1¼ miles each, and the total elevation gained within the spirals or loops proper, exclusive of approaches, some 1,063 ft., or 152 ft. each. The discrepancy between 1,063 and 1,298 ft. above represents that gained by the extra development of the two loops 2 and 3, fig. 5.

This heroic style of location, it is needless to say, has no



Tunnel Spirals on Gotthard Railroad.

examples in this country, nor, so far as we know, in any other. It was particularly desirable on the Gotthard, as it took the line away from the influence of the avalanches and other dangers and climatic annoyances of an Alpine line. Nevertheless, its primary purpose was to keep down grades; the valley distance of 12 miles on one side of the great tunnel being increased by spirals No. 1, 2 and 3 to about 16 miles, while on the other side spirals No. 4 and 7 increased 21 miles to about 26 miles; equivalent to an extension of about 25 per cent., so that without them 3¼ to 3½ per cent. grades would have had to be used instead of 2.7 and 2.5 per cent. As a mere question of engineering economy the reduction, unquestionably, was worth far less than its cost, but the climatic conditions make a judgment as to expediency more doubtful.

In the United States, the only tunnel spiral known to us is that on the Southern Pacific Railroad, which turns around a small hill on a long grade, gaining 78 ft. of elevation by a spiral 3,800 ft. long. One was projected in Bedford County, Pa., in 1865-6, and illustrated in Vose's "Manual for Railroad Engineers," some 8,300 ft. long, very nearly on what has since become the South Pennsylvania line, but the line of the latter now passes the same locality without using the spiral, the work on which was of a rather forbidding character. There are no spirals, we believe, on the heavy work of the Peruvian or other South American lines, and we can refer to none other than are here mentioned, either bridge or tunnel, in any part of the world, although we have an impression that there are one or two.

Steel Tires vs. Chilled Wheels.

The regular monthly meeting of the New England Railroad Club was held at the Club's rooms in the Boston & Albany passenger station on Wednesday evening, Nov. 18. Mr. J. W. Marsden, President of the Club, in the chair. There was a large attendance.

Messrs. Marsden, Lauder and Adams were chosen as a committee to confer with a committee of the Boston Society of Civil Engineers as to expending \$225 jointly in providing chairs, carpets, etc., for the room in which both clubs hold their meetings.

The Secretary then read a communication from the Young Men's Engineering Club, of Prague, Austria, asking for information as to the organization, by-laws, etc., of the New England Railroad Club. It was resolved to send the required information.

Mr. F. D. ADAMS (Boston & Albany), moved that the Club in future meet on the second instead of the fourth Wednesday in the month. The motion was carried after some discussion.

The president announced that the subjects for discussion were "The Economy of Grinding Chilled Wheels" and "The Economy of Using Steel Tired Wheels," a continuation of the discussion at the last meeting, and stated that there was no other subject which the Club could discuss with so much profit to railroads.

Mr. H. A. LITTLE (Patent Shaft & Axle-tree Co.): Three main points have to be considered in this question as to the economy of steel-tired wheels.

1st. The mileage depends almost wholly on the quality and thickness of the tire.

2d. All tires wear down in the course of time, and are then liable to stretch and become loose, or break by hard blows, frosts and other causes, thereby destroying property, and endangering life or limb.

3d. A centre which is almost absolutely safe and strong, and while light, is in no danger of being distorted by expansion or contraction of the tire by the action of brakes creating a torsional strain on the whole fabric, or by the rolling strain or pressure of tons carried is a very strong argument in the question of economy in the use of steel-tired wheels.

The cost of repairs as well as the first cost must be taken into consideration. No railroad wants to carry a large stock of extra wheels and axles, all fitted up waiting for use, than is absolutely necessary. In many cases the old wheels when taken out have to be sent many miles away to be repaired, when such repairs can and ought to be made and wheels replaced in service in a few hours in the railroad company's own repair shops.

I hope this important subject will be thoroughly discussed, and that all interested will give vent to their views.

The following letter addressed to the Club was then read:

"ALTOONA, Nov. 14, 1885.
"I have with much interest read in the *Railroad Gazette* of Nov. 13 the report of your last meeting, and take the liberty to address you on car-wheel grinding machines, and the cost of grinding.

"A car-wheel grinding machine was first introduced on the Pennsylvania Railroad in 1881. The machine, although in

several respects faulty and incomplete in its construction, demonstrated that wheels could be ground at such a low cost that it would be to the company's interest to have several machines located at the principal shops along the line. An improved machine was built and placed in the West Philadelphia shops. This machine has been in constant use since the early part of this year, and has given such good results that it was decided to build six more machines, the heads being still further improved. Two of the machines will be completed in two weeks, and the other four in about a month.

"These machines are designed to grind wheels on their axles, without moving the heads on the bed plate. Either inside or outside journals can be used. The wheels are made to revolve by means of three pronged heads on the spindle having yielding points in contact with the under side of the rim, thus being able to grind plate wheels without making a hole in the wheel, and at the same time securing a steady motion, free from vibration. The outside hollow spindles holding the clamping arms are operated by large hand-wheels, and are independent of the inside spindles, which support the wheels in their position. The arms have radially adjustable contact points for different sizes of wheels.

"The machine is simple in its operation, and perfect in the execution of the work, making the tread smooth and round. A pair of wheels can be changed in the shortest time possible, and any laborer can run the machine after two days practice. The machine has been so successful that a patent has been applied for. I shall be pleased to give any further information."

C. LINDSTROM.
It gives me great pleasure to endorse the above statement. Mr. Lindstrom's wheel-grinding machine is entirely successful.

J. B. COLLIN,
Mechanical Engineer, Pennsylvania Railroad.

The following letter, inclosed in the above, was then read from Mr. William T. Miller, foreman of the wheel shop at Altoona:

"Four years' experience of grinding had shown that both new and old car wheels would be made round by this process, and thus last longer and run more smoothly. Ordinary car wheels are not round and cannot be made so by the usual processes of boring and mounting. Grinding new wheels not only cures eccentricity, a great cause of slid wheels, but cuts off all the irregularities in the tread caused by the shrinkage of the brackets, leaving the tread perfectly smooth and much less liable to be slid, as all points in the periphery are equidistant from the centre, leaving no high points to be caught by the brake. The smooth round wheel improves the riding of a car and diminishes the power required to draw a train. The wheel grinding machine renders it possible to use second-hand wheels, which often give a very satisfactory mileage. A pair of 33 in. wheels can be ground at almost a nominal cost on the machine now in use, and the six machines now being built at Altoona will probably do the work more cheaply than the old one. Several thousand condemned second-hand wheels have been reground at Altoona, and have given very satisfactory results in service. The writer considers that a wheel grinding machine will soon repay its first cost, as the cars ride smoother, the roadbed and tracks are less damaged, and the wheels make a greater mileage."

The following letter was then read:
"CENTRAL PACIFIC RAILROAD,
"SAN FRANCISCO, Cal., April 26, 1883."

"The Chilled Car Wheel Grinding Co.:

"Four of your wheel grinding machines have been in service in our main shops at Sacramento for over three years, with the following results:

"Total number of wheels ground and average cost each during three years ending Dec. 31, 1882.

| Size.....in. | 24 | 26 | 28 | 30 | 33 | Average. |
|--------------------|---------|------|------|-------|--------|----------|
| Average cost..... | \$ 1.10 | 1.10 | 1.28 | 1.38 | 1.51 | 1.33 |
| Number ground..... | 4 | 426 | 396 | 1,317 | 11,622 | 4 |
| | | | | | | 13,169 |

9,389 were old wheels, and 3,780 were new wheels.

"The detailed total cost of grinding these wheels was as follows:

| | |
|---|------------|
| Labor, grinders, helpers, etc..... | \$3,854.12 |
| Emery wheels..... | 3,256.83 |
| Repairs to machinery, shafting, and belting, and oil for lubricating..... | 1,512.59 |
| Power (estimated)..... | 950.00 |
| Royalty, 50 cents per wheel..... | 6,784.00 |
| Interest on cost of machinery..... | 600.00 |
| Depreciation..... | 0.00 |

\$17,717.54

Add for contingencies, 10 per cent. 1,771.75

Total cost..... \$19,489.29

"Of the old wheels grounds, 87 per cent. were flattened, and without grinding would have had to be replaced with new wheels. The following shows the saving effected by grinding:

8,258 new wheels, @ \$14, to replace flat

wheels..... \$115,612.00

Cost of taking old wheels off axle and

putting on new wheels, @ 27 cents..... 2,229.66

\$117,841.66

Less

Value of old wheels for scrap, \$7 each..... 57,806.60

Cost of grinding old wheels, \$1.48 each..... 12,221.84

70,028.44

Saving in three years on flat wheels..... \$47,813.82

"The advantages and economy in grinding new wheels cannot be shown in dollars and cents, but are very considerable.

The liability to flatten, crack, get loose on axle, and wear generally is materially lessened, while the benefits to cars and tracks must be correspondingly increased.

"C. A. GROW,

"Auditor M. P. and M. Dept.

"We certify to and concur with above statement.

"BENJ. WELCH, M. C. B.

"A. J. STEVENS, G. M. M.

"Approved, J. A. GILLMORE, Gen. Supt."

Mr. R. W. ALLISON (Allentown, Pa.). The Chilled Car

Wheel Grinding Co. are sending me some further information, which is unfortunately not in time for this meeting.

Mr. LEACH (Nashua Steel Works): A fair statement of the

comparative wear of American and Krupp's tires cannot be obtained, because American tires have not been in use long

enough to get into the same general use as Krupp's tires.

Many master mechanics put Krupp's tires on their passenger

engines and American tires on their freight and switching

engines. Tires will wear faster in switching than in freight

service, and faster in freight service than in passenger

service. No fair comparison can therefore be made between

Krupp and American tires, Krupp's tires placed where

there is the least wear, and American tires where

there is the most. I wrote lately to the three American

tire manufacturers asking for any certificates giving

the comparative wear of Krupp's and of their own

make of tires. One firm replied that they had no such

statistics, though they had tried to get them. Another

manufacturer gave no answer. From another I received a letter

which I will read. This is no place to peddle wares, and

therefore, I will only speak of American tires, without specifying the make. The following is a letter from Mr. Hewitt,

of the Missouri Pacific to the Baldwin Locomotive Works:

"The accompanying tracing shows the condition of the

flanges of front and back driving tires of Consolidation Engine No. 826, originally No. 126. We think these flanges

are good, considering the kind of engine and the 60,388 miles run. The left forward flange is worn more than the others, which is accounted for by the centre-pin for truck being a little out of centre on the engine. The other Consolidation engines have flanges in better condition, as there is less difference between the right and left side."

The blue print shows the original condition of the tire and the wear after running 60,388 miles. This is $\frac{1}{4}$ in., making more than 15,000 miles to $\frac{1}{4}$ in. wear. Some of these engines had Krupp and some American tires.

In answer to further questions I received the following letter:

"Some time ago the Baldwin Locomotive Works built some engines for the Savannah, Florida & Western Railway, on which the railway company paid \$100 extra per engine to have Krupp's tires; but they reported in January that our tires on the same engines were doing nearly as well. About



three years ago the Wabash, St. Louis & Pacific put a set of our tires on one engine, and a set of Krupp's on another of the same class, and ran them in the same service, and at last reports, if there was any difference in the wear of the tires, it was in favor of ours.

"Up to the early part of this year our tires made 16,350 miles to $\frac{1}{4}$ in. wear on Cooke consolidation engines weighing 107,000 lbs."

The master of machinery, Central Pacific Railroad, replies:

"I have used the American tire ever since it was first manufactured, and I consider it far superior to the Krupp's or any other imported tire." The general average of all American tires on the Wabash, St. Louis & Pacific from Jan. 1, 1880, to Jan. 1, 1882, was 9,704 miles to $\frac{1}{4}$ in. wear; and of all Krupp's tires for the same time 7,516 miles."

Mr. GRIGGS (Providence & Worcester) then read the following statement, showing the wear of driving tires in freight service, no driver brakes being used. All engines are precisely similar; cylinders, 18 x 26; total weight, 82,000 lbs.; original thickness of tires, 3 in.

| Name of engine | Leete | Bacon | Kelton |
|--|-------------------|-------------------|-------------------|
| Make of tires | Standard | Krupp | Krupp |
| Present thickness | $\frac{1}{4}$ in. | $\frac{1}{4}$ in. | $\frac{1}{4}$ in. |
| Total number of miles run | 245,007 | 168,772 | 181,105 |
| Number of times turned | 6 | 5 | 3 |
| Average mileage each turning | 40,501 | 33,754 | 60,388 |
| Average thickness taken off each turning | .229 in. | .300 in. | .306 in. |
| Greatest mileage between turnings | 56,702 | 51,127 | 62,835 |

Mr. J. N. LAUDER (Old Colony): As none of the engines had driver brakes, the wear is in actual service in pulling trains. The statements that I read at our last meeting, from a certain road, which I won't name, were entirely different from the results that Mr. Griggs gets on his road. I am very glad to hear that the American tire makes so good a showing, because I am thoroughly American in my feelings. I do not want to use a foreign tire, unless we are forced to do it for economic reasons. I am very glad that these statements show that the American tire has given the most wear to a certain amount of reduction in thickness. I have been examining the blue print taken from the tires on the Consolidation engines, and they show a remarkable wear of over 15,000 miles per $\frac{1}{4}$ in. The service on a Consolidation engine is very much lighter, however, than on an eight-wheeler. I can get no such results from any tire on my road. On a Consolidation engine weighing upward of 100,000 lbs., the enormous distributed weight prevents the engine from slipping as much as an ordinary eight-wheel engine would, with perhaps, a good deal more weight on each driver, but a large proportion of weight carried on the truck. I believe that in freight service we should utilize all that weight now on the truck for traction.

This matter has an important bearing on the question of car wheels, as we are all using steel-tired car wheels, and it is very important to know whether we are getting the best tires.

I have been much interested in the question of grinding chilled wheels, which has had little attention, especially in New England, and well deserves investigation. Every road has more or less slid wheels, which seem unavoidable. If we reduce our leverage so that the wheels will not slide, we cannot make the stops, and when we have to make emergency stops with slippery rails the wheels will slide. If a comparatively new wheel, which has a flat place of $1\frac{1}{2}$ in. diameter, can be ground and made serviceable for a small sum, we all ought to have grinding machines.

Mr. COLEMAN: If a wheel is $\frac{1}{4}$ in. out of round, when it turns once it will raise the car $\frac{1}{4}$ in. and let it down again. The second time it turns it raises the car $\frac{1}{4}$ in. and lets it down again, and so on, and when the wheel has turned four times the car has been raised 1 in. That car is lifted 12 ft. per mile, and in going 50 miles that car has been raised enough quarters of an inch to amount to 600 feet. It takes a great deal of power to raise a 24-ton car 600 ft. high, and the power comes from burning coal in the engine. This is not a matter of the technical schools, a matter of slate and pencil, but a solid fact. I am not a mere figurer, and I didn't learn my engineering in college, and I trust never to speak of a subject purely from the figuring standpoint. You have seen a pile driver at work, and it takes coal to raise the weight, and when you raise this weight on a railroad track it takes coal in the engine in addition to the coal that is expended for traction.

Mr. COLLIS, who is now building chilled-iron safes, tells me that in his judgment to make wheels round, turning is a much cheaper plan than grinding. Very powerful tools must, however, be used.

Mr. WAITT (Boston & Maine): Mr. Coleman has forgotten that when the car is lifted, it falls the same distance the next moment, and that this fall gives an acceleration to the speed equal to the amount that it is retarded in raising it, and barring a slight amount of loss by friction, matters are thus equalized.

Mr. COLEMAN: That question has been raised, but I don't quite see it myself, and I should want to figure that over a little closer before I said yea or nay. The thrashing about of the 24 tons weight is certainly a very serious disadvantage, to say nothing of its mechanical effect in burning coal.

Mr. F. D. ADAMS: Is the machine used for grinding wheels on the Central Pacific the same machine as that used on the Pennsylvania? There is a great discrepancy in the cost. The Central Pacific make the average cost \$1.48 a wheel, against 50 cents a wheel on the Pennsylvania.

Mr. ALLISON: The cost of labor is very much higher in California than at Altoona. A royalty of 50 cents must be deducted from the \$1.48. This royalty was a special agreement and does not apply now to the use of any similar machine. Deducting the royalty the cost is 98 cents during the three years ending with 1882, when prices were high. The machines are exactly similar to the first machine used by the

Pennsylvania. The letter from the Pennsylvania read this evening states that the machine which they are now building is an improvement on that first machine, and it may possibly do the same amount of work in less time. Probably the greater part of the difference is due to the smaller cost of labor and emery wheels in the East. The Central Pacific report gave the cost of new car wheels out there as \$14, and they allow \$7 for the wheel when finally scrapped. At that time prices for chilled wheels were very high out there, and this first stimulated them to utilize their old wheels. The Central Pacific use the air brake on many of their freight cars, and as the grades are exceptionally long and heavy, it is impossible to avoid sliding a great many wheels. There are several grinding machines in use in the East.

Mr. LITTLE: As nearly all cast-iron wheels are out of balance, will grinding prevent a tendency to give an unpleasant motion to the car, just as a long shaft will thump when a pulley is not perfectly balanced? A car was complained of as riding badly, having an up and down motion, very unpleasant for passengers. It was attributed to the springs, but there was nothing amiss in the springs or truck, and finally I suggested to the Master Car-Builder that the wheels might be out of balance. To satisfy us, he took the wheels from under the car and put them on a centre, and gave them a revolving motion, and the result showed that the wheels were out of balance. The wheels must be counterbalanced as well as round to avoid the trouble Mr. Coleman speaks of.

The PRESIDENT: The wheels being out of balance would not give an up and down motion to the car.

Mr. LITTLE: The wheels were put into service again after they were counterbalanced and gave no further trouble.

The PRESIDENT: If the wheel was eccentric, it would give an up and down motion, because the axle would travel up and down at every revolution; but if the tread of the wheel was round and true with the centre, it must roll necessarily smooth. It might have a longitudinal motion from being out of balance, which might be detrimental to the good riding of the car.

Mr. ADAMS: Mr. Coleman did not put the thing half as bad as it might be. Suppose the wheels are $\frac{1}{4}$ in. out of round, and they are put on diagonally, then there is $\frac{1}{4}$ in. over on the front right-hand corner, and $\frac{1}{4}$ in. on the rear left-hand corner of the car, which would make two lifts at every revolution, and it would give a still more complicated and uncomfortable motion, because the car would be going up and down at either end. Some cars have that motion, and others are so built that a person can hardly stand in them. I have known wheels to be bored as much as $\frac{1}{4}$ in. out of centre. If the wheels are bored out of centre only a trifle, and one put on one way and the other the opposite way, on the axle, the car will have a very unpleasant cross corner motion. I am fully satisfied that the grinding of car wheels is a great economy to railroads. Experience will show which is the best machine. Cast-iron wheels will vary on an average from $\frac{1}{8}$ in. to $\frac{1}{4}$ in. out of round, and occasionally more.

Mr. SIMMONDS: A grinding machine on our road averages about three a day. A laboring man gets \$1 or \$1.25 a day, and a pair of emery wheels costing about \$33 a pair will grind about 25 pairs. The weight of a wheel is reduced from 18 to 30 lbs. by grinding, thus diminishing the strength by taking away metal from a vital point, the tread.

Mr. COCHRANE (Boston, Revere Beach & Lynn) asked whether the wheels referred to in the statement of Mr. A. B. Pullman* were put in the centre of a six-wheel truck or on the outside where the brake is applied.

Mr. LAUDER: It would not make any difference, because the leverage on Pullman cars is very light.

Mr. COCHRANE: I have never seen a chilled wheel that would not grind through with the brakes in half the mileage stated by Mr. Pullman. I have found wheels 14 lbs. out of balance, though almost perfectly round on tread, and it was impossible for any one to ride in the car under which they were placed. I took special pains at one time to have all the pedestals planed on the inside and also to have the housing boxes planed as close as was possible. The result was that they jarred the passengers and had to be taken out after 24 hours' run. Elasticity is required on a rough road with sharp curves. At my own expense, seven years ago, I had a special set of axles built with a loose and a fixed wheel. They were very well while they lasted, but the expense was very considerable. The cost of fitting it up would be about \$15 an axle for the wheel. We have chilled car wheels which have been condemned under passenger cars, have since run 300,000 miles under gravel trains where they have no brakes. The expense of grinding steel wheels is three times the cost of turning.

Mr. W. R. ELLIS (New York): The tendency of the discussion has been to strengthen my opinion that the steel-tired wheel is to be the wheel of the future. The principal attempt here has been to prove that it is necessary to have round wheels. Now, steel-tired wheels must be round. I have not heard it stated that the grinding of wheels made them any safer. The principal reason for adopting the steel-tired wheel is to get safety. That alone is argument enough in favor of it, if there were nothing else. But I have heard it stated that the grinding of wheels weakened them.

Mr. BARNES (Allen Paper Car Wheel Co.): If the Pullman Co. has had such good success in using ground wheels why don't they use them now? For the last two years they have used nothing but steel-tired wheels. If they could get 100,000 miles out of old cast-iron wheels they would use them.

Mr. LAUDER: There must be some mistake in Mr. Pullman's statement that such extraordinary mileages were made by chilled wheels taken from the scrap heap and trued up by an emery wheel. Individual pairs of chilled wheels have occasionally made upward of 100,000 miles. But chilled wheels will not make such mileages as those figures show. A chilled wheel that makes 60,000 miles is giving an extraordinary run, and I cannot believe that old condemned wheels picked up off the scrap pile can have made double that mileage.

Mr. ADAMS: A round wheel will make more mileage than a wheel that is not round, and if chilled wheels can be made round for \$1.50 a wheel, it is economy to grind them. Iron car wheels do not average through the country over 40,000 miles, and they don't average 40,000 miles with our passenger equipment. If they can be made to average even 50,000 or 60,000 miles by being true, wouldn't it be a matter of economy for us to get a machine that would thus increase the mileage? The very plain, clear and lucid statement of the experience on the Pennsylvania shows that the grinding costs 50 cents a wheel, which is saved from the scrap heap, and makes double the mileage.

Mr. CURTIS: We have lately obtained some ground wheels at a slightly greater first cost than the ordinary chilled wheel.

Mr. LAUDER: Wheels should be ground where they are first manufactured, and made perfectly round before they are put into service. This should be done by the manufacturers, or by the roads before they are bored. The wheels should be put in and centred and ground so as to remove as little as possible, and then put into a chuck and bored, and

*This statement was given in the report of the discussion at the previous meeting of the Club. See Railroad Gazette, page 721, Nov. 13, 1885.

that would insure a perfectly round true wheel. The right principle is to true the wheel before it is placed upon the axle. Then bore it in the centre, and it is a perfect thing to start with. Whether it would pay to grind the wheels after they had been removed for sliding, or spotting out, or the flanges wearing, is an entirely different question. There is a risk of weakening the wheel, in taking off part of the best working metal, and after that is done, a wheel cannot give very much service.

Mr. LITTLE: Some years ago Mr. Stevens, the Master Car-Builder of the Union Pacific, remarked to me that he paid more attention to his car truck than he did to the body. He took the wheel before it was bored, and put it on a roll turning machine, with tools ground to the contour of the tread with a scraping edge, and trued his wheel perfectly on the periphery and flange, and then bored from that. The Union Pacific cars were always noted for good riding, although their speed was then only about 18 miles an hour. I know of a recent case where a pair of 42-in. steel tired cast centre wheels (the cast iron and the steel being run together), were put under a car, and the car was reported as riding very badly. Both wheels were round, but were heavily out of balance, and the difficulty could only be stopped by chipping iron enough off of one of the wheels on the inside to counter-balance.

Mr. CURTIS: I would move that it is the sense of this meeting that the grinding of chilled wheels by the manufacturers absolutely true before they are sent to the railroads, would be a matter of benefit to the railroads.

Mr. ADAMS: I believe that is right, but I don't know whether it would be proper for us to pass such a resolution. We might pass fifty resolutions, but the manufacturers would not do it until they were obliged.

Mr. LAUDER: They would do it if it was for their interest.

Mr. GEORGE RICHARDS (Boston & Providence): I recently visited a railroad shop where they had a grinding machine at work. They did not grind new wheels, nor old ones which were much worn, as these soft places would soon develop, and the grinding would be useless. It paid to grind wheels that were worn true, showing a good tread, or wheels that were slightly flatted from the brakes. It took about half an hour to grind a wheel, but it took about an hour to get one pair of wheels out and to get another pair in, and to test it to find whether it was worth grinding or not. Grinding would improve a new wheel. The manufacturer ought to make the wheel true, and in ordering wheels parties should specify whether they wanted round or square wheels. Some manufacturers are already grinding the wheels if ordered.

Mr. LAUDER: Mr. Curtis' motion could be modified thus: "That it is the sense of this Club that we should have perfectly cylindrical wheels when they are put into service." I would be ready to join with the rest of the roads centring in Boston and reject all wheels that were not round. A ring bored out and slipped on will show whether the wheel is round or not. The makers can cast a wheel round or grind it round. They guarantee a certain mileage, and would not grind off enough to injure the chill.

Mr. LITTLE: It would be unfair to insist on that when wheels are furnished at \$6.75 apiece.

Mr. LAUDER: Railroads in New England don't buy \$6.75 wheels.

Mr. GORDON: On one of our trains last summer the average number of cars was 17, and 75 per cent. of the wheels were chilled wheels. If Mr. Coleman is right as to the power required we have some mighty good engines on the road. Some two years ago I bored out the ring mentioned by Mr. Lauder. We test every wheel by this ring, and we bore all the chills in our shop. Since then no wheel has been $\frac{1}{4}$ in. out of round. If the chills are kept in good shape, all wheels would be practically round. It would possibly be economy to grind a wheel flattened $1\frac{1}{2}$ in. diameter.

Mr. RICHARDS: Every effort should be made to have the chilled wheels round, either in casting or in grinding. It will probably be a good many years before the chilled wheel can be said to be a thing of the past. It has been produced in this country for about 56 years, and it is an American institution. The steel tired wheels have been in constant service for a little over 30 years. The chilled wheel, of course, is a great deal cheaper than the steel wheel or the steel tired wheel. On the other side of the water the roads are using almost exclusively steel tired wheels, except where the old wheels of the same form and nature were equipped with wrought iron tires, which were made before the discovery of cheap steel. The greatest road in this country is using almost exclusively cast iron chilled wheels; while on the other side, the London & Northwestern, termed by some the greatest road in the world, whose locomotives run a distance of 53,000,000 miles a year, or round the world every four hours, is entirely equipped with steel tired wheels. It will be a long time before the railroads in this country fit all their passenger coaches, even, with steel tired wheels. The millions of dollars which it would cost to make the change forbids it. Steel tired wheels, all things considered, are doubtless the best, as they are round to begin with, and can be kept round.

The meeting was then adjourned.

Contribution s

The First Through Cantilever Bridge—Correction.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of Oct. 30, where you gave the description of the cantilever bridge over the St. John River, you state that this is the first through cantilever bridge ever erected. This is a mistake. The first cantilever bridge with independent middle span was designed by me in 1879. It was executed at the Crumlin Works in 1880, and was the first cantilever bridge proper ever erected, and it is also a through bridge. It has a span of 328 ft., is 440 ft. long over all, and the outside or anchorage spans are made short, so as to fit the bridge with the minimum of iron. This bridge is a roadway bridge over the Magdalena River, in the United States of Colombia, where there is at present also the first example of a cantilever arch bridge for a railroad, with five hinges, 360 ft. span, as patented in the United States in 1873, in process of being erected.

CHAS. B. BENDER.

A Substantial Corporation.

The annual report of the Boston & Providence Co. for the year ending Sept. 30 last—the 54th year of its corporate existence and the 50th of the operation of the road—says historically:

The Boston & Providence Railroad Co. was chartered June 22, 1831, and the road was opened for travel between the two cities from which it takes its name in August, 1835. Under many vicissitudes it has continued to do a fair business in the interests of the public and its constantly changing body of stockholders, and has naturally been the means, in part, of increasing the value of all real property in the vicinity of

its track, and of promoting the prosperity of towns and cities.

The average annual dividends paid for 50 years have been \$7.41 per share. For the last 10 years the annual dividends have averaged \$7.45.

The market price of the stock to-day, about \$180, gives no greater income to the holder than when the same rate of dividend it sold at \$130 or less. Prices paid for the shares of many of the older railroads in New England are not based upon any sudden increase in business, but on the change in the value of money, and these shares are bought, or are supposed to be bought, with a full knowledge of the untold risks of competition, and of the unforeseen casualties to which every railroad is liable.

Double and treble tracks, stations but half a mile apart (dépôts as they were called), engines weighing 40 and 50 tons, cars carrying from 60 to 70 passengers, sleeping cars, steel rails of great weight, the telegraph, the air-brake, and electric signals were not thought of in 1835. Higher speed, many more trains, and lower fares were predicted by a few sagacious persons, but they were regarded as dreamers. The results of to-day far surpass their most pleasing reveries and sanguine forecast.

THE SCRAP HEAP.

A Frigid Outlook.

There is a dry humor in the dispatch from Montreal stating that no passenger trains will as yet be run on the Canadian Pacific, facetiously observes the *San Francisco Chronicle*, and then proceeds to "poke fun" at the road. The directors, the dispatch says, "are anxious to watch the action of the glaciers and snowfalls for a few months." This is a very good idea. When Lord Milton made his survey for the road, he reported that there were spots in the valley where the snow lay 40 feet deep and the topmost branches of tall trees peeped through it like little huckleberry bushes. A railroad train running through a valley by the side of a mountain range in such a country might get buried pretty deep by a snowslide. It would lie buried till the summer came. The passengers' bodies would probably be found in a fine state of preservation, owing to the cold. Whether this would console their relatives may be a question. We had not heard of glaciers in the Saskatchewan Valley. But if there are, the Canadian Pacific directors are quite right in watching them carefully. They will bear a good deal of watching. When a glacier starts on its travels, it carries villages, railroads, and everything else before it.

It is evident that the Canadian Pacific is not going to be a formidable rival to the more southerly lines, at least for some time to come. Snow, ice and frost are impediments which it is difficult to overcome. A moderate quantity of snow may be shoveled away; a certain amount of ice may be thawed out; a certain degree of cold may be endured, but when it comes to mountains of snow, to glaciers of ice, to a steady temperature of 40° below zero for days together, the energies of man are paralyzed by the mere contemplation of such insuperable obstacles. Who is going to run the risk of traveling in a region where a train may be detained for weeks without food or fuel? Who is going to ship goods by trains which may be buried under the snow for months?

If the Canadian Pacific is ever opened to traffic there is one line of business for which it is especially adapted. That is the refrigerator service. Trains of cars laden with beef or butter or milk, or other commodities which require cold to keep them fresh, can travel from end to end of the line, and their contents will be kept in perfect condition without any of the tire-some precautions which the refrigerator service requires on more southerly lines. This is the manifest destiny of our northern neighbor; the carriage of passengers and ordinary goods she must leave to others.

Suing a Railroad Company for Libel.

A dispatch from Waco, Tex., Nov. 19, says: "The case of Richmond against the Missouri Pacific Railway Co. is on trial in the District Court. This is a novel action for libel, with a claim of \$20,000 damages, based on the grounds that the plaintiff was dismissed from the employ of the railroad and his name placed upon the black list of the company, the effect of which acts as a bar to his obtaining employment either in the United States or Canada as a railroader. The dismissal was for alleged negligence and carelessness, which plaintiff denies. The defendants, on demurrer, plead justification and ask for judgment. The question of responsibility for the appearance of the plaintiff's name on the black list is one of proof, to show whether it was the result of individual or corporate action. The case is attracting attention."

Attempted Fraud.

A few days ago Mr. A. Kimball, Vice-President of the Rock Island road, was called upon by a young fellow who presented a letter from A. Watson, General Superintendent of the Detroit, Mackinaw & Marquette road, requesting a pass for G. H. Lyon, an employé of the latter road, from Chicago to Omaha and return. The letter was written on the printed letter-head of the company and properly stamped. The fellow was told Mr. Kimball was out, and was asked to call the next day. The letter was at once sent to Mr. Watson at Marquette, who returned it by mail yesterday. He said that the letter was forged and the young fellow a fraud; that the letter-head, stamp and writing were all forged. He added that he was in receipt of a telegram from George O. Clinton, of the St. Paul road, asking the same question, only the name was changed to G. H. Paterson, also a fraud.—*Chicago Inter-Ocean*, Nov. 19.

It Jarred Out Her Hair-pins.

The wife of an engineer on the West Shore road rode with her husband from Newburgh to Kingston, the other day. For that distance the train runs with great speed, at intervals fully a mile a minute. When she reached that city and dismounted from the engine, her friends who were to meet her, in a chorus inquired: "Well, how did you enjoy it?" "Oh!" said she, "it was splendid, real exciting, but I haven't a hair-pin in my hair." The jar of the engine had shaken all the hair-pins out, so that her hair hung upon her shoulders.—*Port Jervis Gazette*.

Hastening to His Death.

A large, portly man, about 70 years of age, boarded the Illinois Central south bound train Saturday night at Sixteenth street, Chicago, very much excited and almost out of breath. The man's face was ghastly pale and immediately became a deep dark red. His head fell to one side and his form seemed to collapse and shrink. Trainmen and passengers sprang to his relief but the man was dead. He was taken off the train at Twenty-second street and carried into the station. Mrs. Logan, of Hyde Park, was waiting at the station, and at once recognized the dead man as A. C. Boyd, of Worcester, Mass. The man's mysterious death has been partly explained by persons who saw him running to catch the train. He was late and ran across the lake front as he saw the train slacking up at the station. Being a stranger, he did not know of the existence of the wire fence along the track and he did not see it in the dark. He ran full against the wires and was thrown backward to the ground by the recoil. He, however, picked himself up and got on the train, with the result above stated. He weighed nearly 200 pounds,

and the exertion of running, together with the shock of this fall, probably brought on heart disease or apoplexy. Mr. Boyd leaves a wife and three married daughters in Worcester.

A Funny Accident.

Collisions are usually anything but amusing, but Receiver Callery, of the Pittsburgh & Western, struck one of the funny kind not long ago. He was traveling over his own road with a private party, and when the crash came he was leaning over a chest, getting some eatables and drinkables. He made a headlong dive into its depths and the cover slammed down on to him, fastening him firmly. Mrs. Callery made an aerial but undignified flight through a window, and struck on the ground outside with nothing more serious than a few slight cuts and bruises, and a Mrs. Robinson, traveling with the party, was jammed under a berth so tightly that she could not get out without assistance. Nobody was hurt, so when the momentary fright was over, they all enjoyed a good laugh.—*The Railway Magazine*.

Terrible Consequences of an Accident.

The locomotive running a train on a short branch line in Texas recently exploded its boiler—apparently a harmless little puff, for we do not find that any one was hurt. The consequences, however, were heart-rending, for the local paper says that "the engineer, fireman and conductor were compelled to walk back over four miles to town, and arrived in a thoroughly fatigued condition." What became of the passengers we are not informed; they must have been left to their fate in the presumably desolate spot "over four miles from town"—or perhaps there were no passengers.

A New Dodge.

"Just to think of it," he growled, with disgust written on every line of his face. "I was coming out of St. Louis the other day, and, the car being crowded, I gave half my seat to a demure little widow."

"How do you know she was a widow?"

"She told me so. She said she was awfully afraid of being robbed, and knowing by my face that I was an honest man, she wanted me to take charge of her portemonnaie until we reached Chicago."

"And you did?"

"Am I not a fool? Yes, I did, and as she passed it over sweetly said:—

"There's exactly \$90 in it."

"We rode to Chicago without leaving our seats. As we ran in the city I handed her the purse. She opened it and counted the money."

"Why, there isn't but \$50 here!" she said, as she looked up at me."

"But I haven't taken any."

"Well, I am \$40 short, as you see. Perhaps you can explain it to the police."

"And what did you do?"

"I gave her the \$40, of course. Please kick me a few hundred times."—*New York Star*.

TECHNICAL.

A New Street Car Heater.

Superintendent Holmes, of the Cable Car Co., has at last found an appliance which, he believes, will answer the purpose of heating street cars during the winter months, and he has had one attached to a car and will make a practical test of it at the first opportunity. The contrivance consists of a brass cylinder, 4 in. in diameter by 2½ ft. long, inside of which is a piston that is drawn into the cylinder by a spring, whose tension may be tightened or diminished by a small thumb-screw at the end. The cylinder will be filled with gasoline, having a capacity for two gallons, enough to last going 16 hours full blast. The gasoline is forced by the piston into a small copper tube connecting with the heater. At the end of the tube is a generator by which the gasoline is converted into gas, which being lighted produces a very hot flame. The heater is of cast-iron, and is divided into small compartments by partitions of fire-brick, thus allowing the flame to have full play over considerable surface, which becomes very hot and radiates the heat, which, rising through a register, warms the car. The whole apparatus is under the car, and the only thing which is visible from the inside is the register, which is placed as near the centre of the car as possible. The heat, Mr. Holmes says, can be regulated by means of the thumb-screw. The chief value of the contrivance lies in the fact that it does not interfere with the ventilation of a car.

Mr. Lake, Superintendent of the West Division Co., says he also has an arrangement for heating cars for which he has much hope. The North Chicago Co. and the new Adams Street Co. both claim that car-heating is impracticable, and have not done anything in that direction.—*Chicago Inter-Ocean*.

The Buck-Thorn Barbed Wire Fence.

The second annual report (1885), page 45, of the Experiment Station of the University of Wisconsin notices the "Buck-Thorn" solid steel barbed fence as follows:

"After trying many kinds of fence wire, we have found the Buck-Thorn, made by the Buck-Thorn Fence Co., Trenton, N. J., to be the nearest perfection, if not perfect, of all. It is a flattened band of steel a little thicker in the middle than at the edge, with saw teeth about ¼ in. long, set 1 in. apart on the edge of the steel band. As the wire is twisted, these saw teeth present themselves apparently on both edges of the wire though really on one only. The points of advantage, we have noticed, after three years trial, are:

1. Great strength, being the strongest wire we have tried.
2. It is easily seen by stock, as it is a broad band of steel.
3. Being a broad flat band, with saw-like teeth on one edge, it holds the coating of zinc when galvanized without cracking, and the galvanized wire seems very strong, while ordinary galvanized wire is often weak and easily broken.
4. It is a good sheep wire, since from their shape the barbs will not pull out wool from sheep crowding against it. The barbs are severe enough without being so dangerous as those of the ordinary wire.
5. With neat posts a very attractive fence can be made of this wire."

Manufacture of Iron Sleepers in England.

The London Iron Trade Exchange says: "The iron and steel age of railway sleepers seems to be dawning, but a long period will probably elapse before wood is entirely superseded by iron and steel. The Continental works have already made the manufacture of metallic sleepers a special branch of industry, but though our manufacturers are unable to supply the railways in protected countries, we have no doubt that in open markets they will command a large share of the trade. The Anderson Foundry Co., of Glasgow, has a large contract in hand for cast-iron sleepers for the Indian railways. The quantity is said to be 10,000 tons, the delivery extending over a considerable period. The Patent Nut & Bolt Co. is executing a large contract for the Bombay & Baroda Co., and other firms have work in hand for various lines. It is almost certain that the production of metallic sleepers will become one of the most important departments

of the iron and steel trades, and the leading firms in different districts are preparing to meet the demand. The Tredegar Co., whose works are in Monmouthshire, is in a position to complete from 400 to 500 tons of sleepers weekly. The Darlington Steel & Iron Co. has for some time rolled open-ended steel sleepers, and is now putting down plant which will enable it to turn out 350 tons of close-ended steel sleepers weekly."

Condition of the Boston & Albany Track.

The following is Mr. P. H. Dudley's report to the President of the Boston & Albany Co., of his annual inspection of that road with his dynamograph car, made about the beginning of October:

"The recent sixth annual inspection of your tracks I have made with my car shows that the surfacing of the rails, the gauge and line have reached a degree of perfection not deemed probable two years since."

"In 1882 I set my apparatus to eject paint where the deflections of the rails and joints, in a length of 11 ft. equalled or exceeded ⅛ in. under the weight of my car; this amount has been reduced per year until I have just marked the entire main line and branches at ⅛ in., and at this high standard some miles did not receive any spots, and many others only two to ten. A few miles of the 72-lb. rail were since tried at ¼ in. and only received 12 to 15 spots per mile."

"The deflections of the joints have been lessened over ¼ in., and the average sum of the undulations per rail per mile more than ½ in. These figures do not, at first thought, convey their full import as to the saving and benefit due to so much improvement in the track. They mean:

1. Greater safety in doing the business.
2. Increasing the life of the rails by decreasing the unequal wear at the receiving ends.
3. Saving in the wear of the equipment.
4. Decreasing the operating expenses.

"The improvement in surfacing has materially checked the usual rapid wear of the receiving ends of the rails under heavy freight traffic, and they now wear more uniform per rail length, so that the effects of another year's service do not show on the diagrams, except on a few miles of the oldest steel. This is by no means the ordinary result."

"The high standard of your track now reflects the wisdom and skill exercised in the care for the past few years."

Movement of Trains in a Fog.

The New Hampshire Railroad Commissioners, who investigated the fatal accident on the North Division of the Boston & Lowell line at Andover, Sunday morning, Oct. 18, find that, while Emerson, the freight engineer, must be held responsible, still the very fact that he left no specific instructions or intimation as to his intention might well have justified the passenger train in waiting at West Andover, notwithstanding its right, under the rule, to proceed, considering the intense fog and darkness that prevailed, rendering signals of little value beyond two or three cars' length. The rule is explicit and paramount: "In movement of trains where trouble exists, always take a safe course." In moving trains in a dense fog, at night or morning, the greatest precaution is the highest safety, and those in charge of trains in any emergency cannot too closely observe the rules. When mistakes are made they should be on the side of safety. If a rule applicable to such common emergency as trains breaking apart should provide that the detached portion, as well as main portion, shall be set off upon the nearest siding until all trains having the right of road shall pass, no collision could occur from any misunderstanding. If it is necessary to bring parts of a broken train together on the lines of a superior train, then a holding order, when it is impracticable to obtain orders from a train dispatcher's office, should be committed to writing and signed by the respective parties to it. Had this been done in the present case, the collision would certainly have been avoided. A recommendation to this effect is made to the managements of all single track roads in the state. It is also recommended that superintendents ascertain, by some adequate test or examination, that their subordinates understand the rules, and understand them alike.

Steel Boilers.

Mr. F. W. Webb, the Chief Mechanical Engineer of the London & Northwestern Railway, stated at the last meeting of the Iron and Steel Institute of Great Britain that he had made at Crewe about 3,000 boilers of Bessemer steel, working at pressures of 120 lbs. to 190 lbs., and over 2,400 of them were for locomotives. He had also put to work a few boilers of Siemens-Martin steel, without any failure in either case. His experience was that well-made mild Bessemer steel could be quite as much depended upon as the Siemens-Martin. He preferred the latter when a hard metal was required, because the hardness was combined with a greater amount of elasticity. There had not been more than one broken tire during the past year, on a mileage equal to a journey round the world every 4 hours and 10 minutes, to 1½ miles for every second, or 90 miles for every minute.

Test for Adulteration of Manilla Ropes.

Messrs. Frost Bros., an English firm of rope manufacturers, have introduced the following simple test to detect the adulteration of Sisal fibre in Manilla rope. A strand is taken from each of three pieces of rope made respectively from Manilla, Sisal fibre, and a mixture of the two. The pieces having been untwisted and rolled loosely into balls, were burnt on a fire shovel. The Manilla hemp produced an ash having "a dull grayish black appearance," the Sisal fibre a "whitish-gray ash," and the combined materials "a grizzly white and black ash, reminding one of nothing so much as a man's beard when turning from black to gray." This simple test should prove of the greatest value, considering how difficult, if not impossible, it is even for experts to detect Sisal fibre adulteration by ordinary means, and the great inferiority in strength and endurance of that material.

Sisal is produced in great quantities on the peninsula of Yucatan, and closely resembles Manilla fibre in appearance, but is from a different plant, and is not only 50 per cent. weaker than Manilla, but has only two-thirds of its durability.

Liquid Fuel in California.

Experiments are being made by the Central Pacific Railroad Co. with petroleum as fuel on some of their steamboats. On the freight steamer "Thoroughfare," plying between Oakland and San Francisco, the saving in cost of fuel is 44 per cent., amounting to \$1,400 per month. Four firemen are dispensed with, effecting a further saving of \$240 per month. On the "Solano," the biggest ferry-boat in the world, the saving is only 17 per cent. The oil costs \$1.70 per 40-gallon barrel or about 4 cents per gallon. Coal costs \$7 per ton, and is estimated to be equal to 100 gallons of oil costing \$4.25. Other ferryboats at San Francisco are being altered to burn oil.

The amount of petroleum obtained from California has steadily been increasing for the past five years. In 1879, 19,858 barrels were produced, and in 1884 more than 100,000 barrels, thus quadrupling the yield in the space of five years. California now ranks third among the petroleum producing states; New York is second, and West Virginia fourth.



Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

THE ERIE REPORT.

The report of the directors of the New York, Lake Erie & Western Railroad for the fiscal year ending with September last is a straightforward document, setting forth clearly the chief facts in the history of the company for the year. It is issued in advance of the reports of the First Vice-President and the Comptroller, which will contain the detailed statistics for the year, and we must wait for these to make any sufficient analysis of the year's business.

The general financial result is shown by the following statement of the surplus or deficit, after paying all interest and rentals, in successive years since the reorganization:

| | | | | | |
|------|-------|--------------------|------|-------|----------------------|
| 1878 | ..... | Surplus, \$635,432 | 1882 | ..... | Surplus, \$1,160,062 |
| 1879 | ..... | " 1,291,871 | 1883 | ..... | " 1,365,485 |
| 1880 | ..... | " 1,790,021 | 1884 | ..... | Deficit, 608,623 |
| 1881 | ..... | " 1,887,418 | 1885 | ..... | " 1,376,944 |

In 1884 \$1,007,922 of accruing interest was left unpaid, and in 1885 twice as much, and these amounts are nearly \$1,000,000 more than the deficits of the two years.

The amount of the freight traffic on the Erie proper (excluding the leased New York, Pennsylvania & Ohio road) has been, in ton-miles:

| Year to Sept. 30. | Coal. | Other freight. | Total. |
|-------------------|-------------|----------------|---------------|
| 1885 | 705,276,525 | 982,270,163 | 1,687,546,688 |
| 1884 | 676,180,027 | 1,118,706,492 | 1,794,886,519 |
| 1883 | 640,491,106 | 1,338,057,322 | 1,978,548,428 |
| 1882 | 611,076,125 | 1,343,313,585 | 1,954,389,710 |
| 1881 | 574,533,237 | 1,409,861,618 | 1,984,394,855 |
| 1880 | 432,329,839 | 1,288,782,256 | 1,721,112,095 |
| 1879 | 500,436,551 | 1,068,785,806 | 1,569,222,357 |
| 1878 | 267,344,580 | 957,419,138 | 1,224,763,718 |

Thus the coal traffic was larger this year than ever before, and 4 per cent. more than last year. There has been an increase every year except from 1879 to 1880, and the increase since 1879 has been 40 per cent. On the other hand, the general freight, in spite of extraordinarily low rates, was smaller this year than in any other since 1878, 12 per cent. less than last year, 30 per cent. less than in 1881, when it was largest. The total freight movement was the smallest since 1879, was 6 per cent. less than last year, and 15 per cent. less than in 1883, when it was slightly less than in 1881, when it was largest.

The decrease in freight other than coal was due partly to the dullness of business in the country, and partly to the increased competition of new railroads. It is a very serious change when a road like this in spite of a great reduction in rates carries 27 per cent. less merchandise than in 1882 or 1883.

The report does not give the passenger mileage. There was an increase of 9½ per cent. in the number of passenger journeys, and a decrease of 16 per cent. in passenger earnings. As the passenger equipment is reported to have been "taxed to its fullest extent the past season," and as the extremely low rates must have stimulated traffic, there should have been some increase in passenger mileage this year. Moreover, the report says that the volume of passenger traffic was 24 per cent. more than 1878, which would make it 174 millions of passenger miles. Now in previous years the passenger traffic has been, in millions of passenger miles:

| | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|
| 1878. | 1879. | 1880. | 1881. | 1882. | 1883. | 1884. |
| 140.3 | 149.1 | 180.5 | 200.5 | 225.1 | 200.4 | 169.6 |

so that the traffic this year appears to have been less than in any of the four from 1880 to 1883.

The transportation earnings of the Erie proper from different sources have been:

| Year to Sept. 30. | Coal. | Other freight. | Passengers. | Total. |
|-------------------|-------------|----------------|-------------|--------------|
| 1885 | \$4,154,079 | \$8,915,182 | \$3,106,708 | \$15,490,456 |
| 1884 | 4,554,743 | 8,469,519 | 3,698,891 | 17,618,976 |
| 1883 | 4,855,933 | 10,706,206 | 4,134,971 | 20,598,572 |
| 1882 | 4,939,373 | 9,702,755 | 4,384,510 | 19,975,774 |
| 1881 | 4,853,427 | 11,126,149 | 4,041,267 | 20,715,605 |
| 1880 | 3,191,617 | 11,190,498 | 3,682,951 | 18,693,109 |
| 1879 | 3,184,211 | 9,049,270 | 3,118,944 | 15,942,025 |
| 1878 | 2,166,479 | 9,808,011 | 3,070,121 | 15,644,978 |

The amounts for coal and other freights this year are not given in the report, and we have calculated them by multiplying the average receipt per ton per mile by the ton-miles, which are given.

Compared with last year, there is a decrease of 9 per cent. in coal earnings, in spite of the increase of 4 per cent. in coal traffic; a decrease of 18½ per cent. in other freight earnings, while the decrease in traffic was but 12 per cent.; a decrease of 16 per cent. in passenger earnings, and a decrease of 12 per cent. in total earnings. The coal earnings were 14½ per cent. less than in 1881, though the coal traffic was 23 per cent. greater. The other freight earnings were much less than in any other year since the reorganization, 37 per cent. less than in 1880, when they were largest, and even 36 per cent. less than in 1881, when there had been 2½ months of railroad war. We have seen that the general freight traffic has decreased 30 per cent. since 1881, so that the decrease in average rates has not been as great as might be supposed.

The average freight rates per ton per mile have been in cents:

| | 1879. | 1880. | 1881. | 1882. | 1883. | 1884. | 1885. |
|---------------|-------|-------|-------|-------|-------|-------|-------|
| Coal | 0.636 | 0.738 | 0.845 | 0.808 | 0.758 | 0.674 | 0.589 |
| Other freight | 0.847 | 0.869 | 0.790 | 0.722 | 0.800 | 0.746 | 0.704 |
| All freight | 0.780 | 0.836 | 0.805 | 0.749 | 0.786 | 0.719 | 0.656 |

The decrease in the average coal rate is 12½ per cent. since last year, 22 per cent. since 1883, 27 per cent. since 1882, and 30 per cent. since 1881. This is probably not wholly due to a reduction in the tariff rates, but partly and perhaps largely to the carrying of a large proportion long distances, especially to the West. In 1881 and 1882 the rates were higher for coal than for merchandise.

The rates on other freights this year were but 5½ per cent. less than last year—much less than was to have been expected. It may have been because the merchandise and local freight was a larger proportion of the whole, and the grain, etc., a smaller one, but the records of the grain receipts at New York do not indicate this, but the contrary, this road having brought nearly a fourth more grain than last year, while there was a large decrease in its total freight traffic. The rates of 1884 would have increased the general freight earnings but \$412,554; but they would have increased the coal earnings nearly \$600,000. This would have left the net earnings \$364,000 less than the full fixed charges, which is \$228,000 less than the decrease in passenger earnings. Thus, while the rates of 1884 might have enabled the company to barely squeeze through (the heroic reduction in expenses continuing), something more than that will be required to enable the company to pay the proposed increase (after the current year) in fixed charges. That is, the road needs more traffic as well as better rates. Better rates it is almost sure to have, for a time at least, and it is just now having a larger traffic, and if general business continues to improve doubtless will have a further growth. But a great growth will be necessary to make it equal to that of the three years previous to 1884, and as there are now four railroads instead of two between New York and Buffalo to share whatever increase of traffic there may be, we can hardly expect any one of them to make as great gains per year as the Erie made before 1881.

We have seen that the earnings of this railroad fell off more than \$2,000,000 last year. Even more remarkable than this was the decrease in working expenses, which have been since the reorganization:

| Year to Sept. 30. | 1882. | 1883. | 1884. | 1885. |
|-------------------|--------------|--------------|--------------|--------------|
| 1878 | \$10,635,874 | \$13,088,094 | \$13,578,700 | \$12,069,338 |
| 1879 | 11,174,690 | 12,069,338 | 10,663,580 | |
| 1880 | 11,613,925 | | | |
| 1881 | 13,250,230 | | | |

The decrease of \$1,405,758 from last year is 11½ per cent. The decrease since 1883 has been no less than 22½ per cent., amounting to \$3,084,880. This left the decrease in net earnings since 1884 only \$722,762, or one-third of the decrease in gross earnings, and the net earnings in successive years have been:

| Year to Sept. 30. | 1882. | 1883. | 1884. | 1885. |
|-------------------|-------------|-------------|-------------|-------------|
| 1878 | \$5,009,114 | \$6,887,680 | \$7,019,872 | \$5,549,639 |
| 1879 | 4,767,324 | 5,426,867 | | |
| 1880 | 7,049,183 | | | |
| 1881 | 7,459,375 | | | |

The decrease from 1883 is 81 per cent., and from 1881, when net earnings were largest, it is 35½ per cent., but there is a slight increase over 1879, when the gross earnings were \$4,450,000 more than this year.

No safe judgment can be formed on the condition and prospects of this company without an analysis of the working expenses, to ascertain where the great saving of \$1,405,000 was made. These expenses are not given in detail in the directors' report, except that the

expenditures for repairs and renewals of cars are stated, as follows:

| | 1885. | 1884. | Increase. | P. c. |
|----------------|-----------|-----------|-----------|-------|
| Freight cars | \$750,341 | \$641,683 | \$108,658 | 17.0 |
| Passenger cars | 184,154 | 170,204 | 13,950 | 8.2 |

The figures given here for 1884 do not agree with those charged to "maintenance of cars" in last year's report, and the figures under this head have been:

| | —Freight— | | —Passenger— | |
|--------------|-----------|----------|-------------|----------|
| | Total. | Per car. | Total. | Per car. |
| 1883-84..... | \$707,860 | \$24.67 | \$192,297 | \$411 |
| 1882-83..... | 844,557 | 28.53 | 209,325 | 634 |
| 1881-82..... | 793,138 | 27.44 | 216,524 | 492 |
| 1880-81..... | 797,033 | 34.20 | 259,772 | 633 |
| 1879-80..... | 678,170 | 33.80 | 182,065 | 445 |
| 1878-79..... | 639,492 | 36.40 | 145,422 | 367 |

If the excess above for 1884 over the figures given for "repairs and renewals" for that year in this year's report represents some other expenditures on cars, and we take the increase as now given—\$108,658 for freight and \$13,950 for passenger cars—we have the expenditures per car for maintenance this year \$27.77 for freight and \$441 for passenger cars—which is much less than the average, though a little more than last year. The reduction of the freight traffic favored a reduction in car maintenance.

The report affirms that "the track, the car equipment and the locomotive power are in better condition than at the beginning of the year," and there is reason to believe that they are in quite good condition.

All the figures given above are for the Erie proper, excluding the leased Ohio road. Nor has account been taken of the receipts from various sources aside from transportation earnings, amounting this year to \$1,002,092. The lease of the New York, Pennsylvania & Ohio resulted in a loss of \$239,821 this year against a loss of \$270,281 for 1884, and a profit of \$199,540 for the five months of the lease in 1885. The earnings and expenses of this road have been:

| | 1884-85. | 1883-84. | Decrease. | P. c. |
|----------------|-------------|-------------|-----------|-------|
| Gross earnings | \$5,064,877 | \$5,909,498 | \$844,621 | 14.2 |
| Expenses | 3,683,937 | 4,288,740 | 604,803 | 14.1 |
| Net earnings | \$1,380,940 | \$1,620,758 | \$239,818 | 14.2 |

Proportionately the decreases in gross and net earnings and expenses are all greater than on the Erie proper. Its coal traffic increased from 115½ millions to 145½ millions of ton-miles, or 25½ per cent.—a wonderful gain for so bad a year, and very likely due to carrying anthracite through to the West in unusual quantities. In other freight there was a decrease from 588½ to 548½ millions of ton-miles, or nearly 7 per cent. The total freight traffic fell off but 1½ per cent., from 704 to 694½ millions of ton-miles, much less than the Erie's decrease. The rates on this road were higher for coal (0.620 against 0.589 cent per ton per mile) than on the Erie proper, but for other freight they were much lower (0.499 against 0.704 cent), and much lower than the coal rate. This merchandise rate is one of the lowest freight rates ever reported by any railroad, and much below the average cost on most roads.

The Baltimore & Ohio's New York Line.

The Baltimore & Ohio Railroad has made arrangements which will give it an independent terminus in New York harbor, on Staten Island, about five miles south of the southernmost extremity of the city, which will be probably a considerable disadvantage for passenger traffic, but not so much for freight, which can be transferred in barges to any point in the harbor, as is now done by all the railroads, not only by those whose termini are on the New Jersey side of the Hudson, but by the New York Central itself; and there is unlimited warehouse room on deep water on Staten Island.

It will doubtless be of considerable advantage to the Baltimore & Ohio to control its terminus, so far as commanding traffic is concerned; but it is not so certain that it will be profitable. For the terminal work of a trunk line extensive and costly appliances are required—docks, yards, warehouses, elevators, barges and piers in different parts of New York city. The question is whether the New York traffic which the Baltimore & Ohio can command will be large enough to warrant so large an expenditure. Its traffic could certainly be handled at less cost (that is, at less additional cost) by one of the lines already provided with terminals at Jersey City and New York, than by a new plant devoted to the Baltimore & Ohio traffic alone; but the lines would probably charge more than the cost, and would not be likely to leave such a rival entirely independent. Moreover, the Staten Island property is now much cheaper than any other on deep water in the harbor, and terminal property of this kind is likely to increase greatly in value, so that, though the investment may not make good returns now, it may be very profitable hereafter.

Access to Staten Island is to be had by building a new road from Bound Brook, N. J., eastward about 20 miles to Staten Island Sound at Elizabethsport, and there bridging the Sound (which is not wide) and con-

necting with the Staten Island Rapid Transit Railway, which is under construction along the northern shore of the island, close to the water's edge, and is preparing a station and ferry slips at the point of the island nearest New York—perhaps half a mile nearer than the nearest of the present ferry landings, and about six or seven miles from Elizabethport. The new road necessary to reach this landing, which is at New Brighton, Staten Island, will be not more than 27 miles, extending from Bound Brook in nearly an air line a little north of east, over an easy country. The new railroad, however, will be but a small part of the cost of the new terminus.

The use of this line requires that the Baltimore & Ohio should be sure of the use of the North Pennsylvania Railroad from Philadelphia to Bound Brook, a line which has been leased to the Reading for the last six years. How the Baltimore & Ohio could secure it under these circumstances it is not easy to see. The Reading could transfer the lease, and the North Pennsylvania stockholders would doubtless be delighted to change its guarantee of 8 per cent. dividends for the Baltimore & Ohio's; but as until very recently the Reading has been expecting to have a trunk line of its own, and this was an essential part of it, it is hardly conceivable that it should have consented to let it go. It may have contracted to give the Baltimore & Ohio running rights over it; but the latter would hardly be satisfied with this, fearing the Reading might forfeit its lease.

Should the Baltimore & Ohio get the exclusive control of the North Penn., it would probably make an end of the present "Bound Brook Line," between New York and Philadelphia, in connection with the Central of New Jersey. This would probably not be disagreeable to the Pennsylvania Railroad. The Baltimore & Ohio's line to Philadelphia, via Staten Island, would hardly be so formidable a competitor for passengers as the present "Bound Brook Line," which is substantially the same in length as the Pennsylvania, and has similar convenient city termini, which have an immense deal to do with the choice of a route for so short a distance.

The disadvantage of the Baltimore & Ohio is not to be measured simply by the fact that its ferry will be five times as long as the Jersey City ferries, but by the further fact that its New York ferry landing is at the extreme southern point of the island, furthest removed from the residence quarters of the city. Should it establish ferries from uptown piers, as other railroads have done, the difference would be still greater. This is not so great an objection on long as on short journeys, and as a large part of the time and most of the trouble is in getting on and off, and this is the same for a short as for a long ferry, the objection to the ferry will never be in proportion to its length. Moreover, the Staten Island route has the very great advantage that its New York terminus is at the point to which all the elevated railroad trains run, as also two of the Brooklyn ferries.

The Baltimore & Ohio by this arrangement will have a line of its own from New York to Washington, which is one of the most frequented passenger routes in the country. The Pennsylvania heretofore has had the great advantage that it alone controlled a railroad the full length of the line, having the only road between Philadelphia and Baltimore. Not many years ago the Baltimore & Ohio had all the business between Baltimore and Washington, and the new arrangement is not likely to increase the competition between New York and Philadelphia, but it does give the Baltimore & Ohio a much better opportunity to secure a large share of the through business to and from lines south of Washington, and greater advantages for the Western business. For points on the lakes its route to New York is circuitous, but from St. Louis, Louisville, Cincinnati, etc., and points further south, it has one of the shortest lines, and it will also be able to compete for the very important Pittsburgh traffic, which the Pennsylvania heretofore has had pretty much to itself.

The Grain Movement.

The movement of grain to the Northwestern markets was not large last month, having been exceeded by 16 per cent. last year, by 2 per cent. in 1883, by 34 per cent. in 1880, and by 15 per cent. in 1879, but it was 20 per cent. more than in 1882, 38 per cent. more than in 1881, and more than in any year previous to 1879. It has been for the five weeks ending with Oct. 31 for 13 successive years:

| Year. | Bushels. | Year. | Bushels. |
|-----------|------------|-----------|------------|
| 1873..... | 20,490,162 | 1880..... | 44,496,913 |
| 1874..... | 17,712,079 | 1881..... | 34,014,914 |
| 1875..... | 24,733,906 | 1882..... | 27,006,446 |
| 1876..... | 26,798,292 | 1883..... | 33,854,335 |
| 1877..... | 26,286,610 | 1884..... | 38,349,639 |
| 1878..... | 26,609,289 | 1885..... | 33,137,866 |
| 1879..... | 37,960,885 | | |

Considering the failure of the winter-wheat crop, the

receipts this year were probably all that could be expected. There was a large gain in the corn receipts (2,705,000 bushels, from 6,716,135 to 9,421,718 bushels, or 40 per cent.), but a much greater decrease in wheat receipts—from 19,142,343 to 13,352,276 bushels, amounting to 5,790,000 bushels, or 30 per cent.

This decrease has been chiefly at the winter-wheat markets, but not wholly, by any means, the wheat receipts of the principal markets having been for the five weeks:

| | 1885. | 1884. | Decrease. | P. c. |
|----------------|------------|------------|-----------|-------|
| Duluth..... | 2,964,121 | 3,794,938 | 830,817 | 21.8 |
| Milwaukee..... | 1,051,022 | 1,599,745 | 548,723 | 34.3 |
| Chicago..... | 2,542,986 | 5,088,803 | 2,545,817 | 50.0 |
| St. Louis..... | 879,844 | 1,787,850 | 908,006 | 50.8 |
| Toledo..... | 1,641,857 | 4,166,929 | 2,525,072 | 60.6 |
| Detroit..... | 1,980,540 | 2,281,382 | 300,842 | 13.2 |
| Total..... | 13,352,276 | 19,142,343 | 5,790,067 | 30.2 |

Probably most of the great decrease at Chicago, as well as the whole of that at St. Louis and Toledo, we may charge to the bad winter-wheat crop; but we see also a considerable decrease at purely spring-wheat markets, 22 per cent. at Duluth and 34 at Milwaukee. The place which has suffered least is Detroit, as was to be expected, since Michigan had an exceptionally large wheat crop this year—larger than last year. The yield of spring wheat was less this year than last, but not so much less as the yield of winter wheat, and there is nothing in the October receipts to indicate that the crop has been held back any more than usual this year.

The very great decrease in the winter wheat crop has left most of the winter-wheat states with very little to spare. The percentage of decrease in the amount marketed must be very much greater than the percentage of decrease in the amount harvested. Illinois, for instance, is credited with a crop of 22,300,000 bushels this year, and its own requirements for bread and seed must be 18,000,000 bushels or more. In 1880 it produced more (60,000,000) and required less for its own use. It could have spared at least 42,000,000 bushels then, and only 4,300,000 now. Thus a decrease of 62 per cent. in the crop has reduced the marketable surplus nearly 90 per cent. We see something of the same nature in the greater percentage of decrease at Atlantic ports than at Northwestern markets. In the 10 weeks to Oct. 31, the wheat receipts were:

| | 1885. | 1884. | Decrease. | P. c. |
|------------------------------|------------|------------|------------|-------|
| At Northwestern markets..... | 18,987,875 | 32,944,804 | 13,956,929 | 42.3 |
| At Atlantic ports..... | 12,378,141 | 24,159,195 | 11,772,054 | 48.7 |

The decrease is about three-sevenths in Northwestern receipts, and nearly one-half in Atlantic receipts.

The shipments of the Northwestern markets for the five weeks ending Oct. 31 for four years have been:

| | 1882. | 1883. | 1884. | 1885. |
|------------|------------|------------|------------|-------|
| 19,402,843 | 27,071,571 | 26,977,907 | 24,677,935 | |

Thus the shipments this year were but 2,314,000 bushels (8½ per cent.) less than last year, while the receipts were 5,212,000 bushels (13½ per cent.) less, showing that the accumulation of stocks was less than usual in October, and not more than usual, as might be supposed from statements published.

This impression, that the last crop has been held back more than usual, is doubtless due to the fact that the stock of wheat in elevators, west and east, is now larger than ever before. This, however, is not due to holding back the receipts since harvest, but to an extraordinary accumulation before harvest. In the natural course of things most of the wheat goes to market before the end of December of the year in which it is produced, and the consumption of the first half of the following year is chiefly from what has accumulated before Jan. 1. A large increase in the stock on hand for some months after harvest therefore always takes place. This year so far this accumulation—the increase of the stock on hand—has not been larger than usual, but decidedly smaller than usual. This is shown by the following statement of the increase in the visible supply from July 4 to Oct. 31 for the last three years, in bushels:

| | 1885. | 1884. | 1883. |
|---------------------|------------|------------|------------|
| Wheat..... | 9,386,834 | 20,896,397 | 12,591,185 |
| Oats..... | 720,980 | 310,859 | 1,801,853 |
| Barley..... | 1,844,276 | 2,194,201 | 1,968,539 |
| Rye..... | 513,225 | 35,635 | 646,275 |
| The four..... | 12,465,315 | 23,305,822 | 17,007,852 |
| Corn..... | 2,044,146 | 1,800,872 | 2,000,755 |
| Total increase..... | 10,421,169 | 21,504,956 | 15,007,097 |

Thus in wheat this increase in the visible supply during the last four months was 11,500,000 bushels (55 per cent.) less than last year, and 3,204,000 bushels (25½ per cent.) less than in 1883. Taking all grains together, the increase in the visible supply since July 4 has been 11,144,000 bushels (51½ per cent.) less this year than last, and 4,586,000 bushels (30½ per cent.) less than in 1883. Thus the accumulation of stocks which makes so strong an impression now took place before harvest, and for the most part a year ago, and has been weighing on the market ever since. The wheat received since harvest has been less in

proportion to consumption than in any other recent year.

This is especially true of the Northwestern markets, whence must come the principal part of the grain traffic of the railroads for the remainder of the crop year. Their aggregate stocks of wheat Oct. 31 this year were not one million bushels more than on July 1—25,753,000 bushels against 24,776,000, with very little change in their stocks of other grain. The increase in the visible supply has been almost wholly at the seaboard. The Western markets since harvest have forwarded the wheat as fast as they received it, and but for their extraordinary stocks at the beginning of harvest the prospect would be for an exceptionally light winter movement.

At several important Western markets there has been a decrease in the stocks since July 4, as the following statement of them shows:

| | Oct. 31. | July 4. | D. c. |
|----------------|------------|------------|-----------|
| Chicago..... | 13,177,691 | 14,807,683 | 1,629,992 |
| Milwaukee..... | 2,941,531 | 3,208,407 | 266,876 |
| Duluth..... | 1,706,195 | 2,513,195 | 806,999 |
| St. Louis..... | 2,726,717 | 1,694,150 | 1,032,567 |
| Toledo..... | 2,396,511 | 892,081 | 1,504,430 |
| Detroit..... | 1,810,327 | 494,847 | 1,315,480 |

Thus the stocks have increased only at the winter-wheat markets, while at the spring-wheat markets they have decreased.

Thus the indications are that advantage has been taken of the very low rail rates to ship to the seaboard an unusually large proportion of the wheat received at the lake ports and other Northwestern markets since harvest, for of the increase of 9,387,000 bushels in the total visible supply since July 4, no less than 8,410,000 bushels has been at seaboard and other Eastern markets. This may explain why the shipments have been so remarkably light since rail rates were advanced. The stocks available in the East for consumption or export are so very large that there is no pressing demand, and the Western elevators are very little fuller than when harvest began, so that the necessity of making room in them is not severely felt. Taking them altogether, there is more room in them now than there was a year ago, with very much less wheat to come forward from the farmers. This may be more than counterbalanced by an increase in corn receipts, but the corn is not likely to come forward in the winter much faster than it is consumed or exported. Farmers are accustomed to keep their surplus stocks of that grain until after navigation opens in the spring, unless the price is high in winter.

Only six additional roads have reported their October earnings this week, and these all small ones, their aggregate earnings being but about one-fourth as much as those of one of the great Chicago roads. Four of the six roads had an increase of earnings in October, and in the aggregate earnings of the six there was an increase of 7½ per cent.

Earnings have now been reported for October by 64 railroads, as follows:

| | 1885. | 1884. | Increase. | P. c. |
|---------------|--------------|--------------|-----------|-------|
| Earnings..... | \$24,383,830 | \$23,416,942 | \$966,888 | 4.1 |

The Pennsylvania report, due this week, will be looked for with unusual interest, as indicating the effect of changed conditions on Eastern railroads.

The Lake Shore & Michigan Southern report for the three months ending Sept. 30 shows but small changes compared with last year—a decrease of 1.7 per cent. in gross earnings, of 0.6 per cent. in working expenses, and of 3.3 per cent. in net earnings. There was also a slight decrease in fixed charges. But the quarter was a bad one last year, yielding a profit over fixed charges of but 84 cents per share of stock, which is reduced this year to 78 cents. It is, however, an improvement over the previous two quarters of the year, for in the first quarter of the year the road lacked \$62,606 of earning its fixed charges, and in the second quarter the deficit was further increased by \$13,304, while in the third quarter there is a profit of \$383,207. If we compare this third quarter with the corresponding quarter of 1883, we shall find:

| | 1885. | 1883. | Inc. or Dec. | P. c. |
|---------------------|-------------|-------------|--------------|-------|
| Gross earnings..... | \$3,677,361 | \$4,540,239 | -\$862,878 | 19.0 |
| Exp. and taxes..... | 2,337,125 | 2,609,086 | -\$271,961 | 10.4 |
| Net earnings..... | \$1,340,236 | \$1,931,153 | -\$590,917 | 30.6 |
| Fixed charges..... | 557,028 | 874,702 | -\$317,674 | 36.2 |
| Surplus..... | \$783,208 | \$1,056,451 | -\$273,243 | 26.7 |
| Per share..... | 0.78 | 2.13 | -1.35 | 63.7 |

The whole year 1883 resulted in a profit of \$8.11 per share, so that this quarter yielded but little above the average. Considering what the rates were this year, the wonder is that even 78 cents per share was netted, and the current quarter ought to show a much better result.

For the nine months ending with October the surplus of the road has been \$307,297 this year, against \$1,368,956 last year, and \$2,803,252 in 1883, or 63 cents

per share this year, against \$2.77 and \$5.66 in the two previous years. A very great improvement has yet to be made before the results of 1883 and several previous years can be attained.

A comparison of the Baltimore & Ohio with the Erie report for the year ending with September shows:

| Gross earnings, 1881-85. | 1883-84. | Decrease. | P. c. |
|---------------------------|--------------|-------------|-------|
| B. & O. \$16,616,642 | \$19,430,607 | \$2,813,965 | 14.5 |
| Erie. 15,490,456 | 17,618,976 | 2,128,520 | 12.1 |
| Expenses. | | | |
| B. & O. 16,973,585 | 11,676,307 | 707,278 | 6.0 |
| Erie. 10,063,580 | 12,009,338 | 1,405,758 | 11.7 |
| Net earnings. | | | |
| B. & O. 5,643,057 | 7,754,300 | 2,111,243 | 27.3 |
| Erie. 4,826,867 | 5,549,639 | 722,772 | 13.3 |

The Baltimore & Ohio earnings were from 1,628 miles and the Erie's from 1,029. The Erie suffered most from the competition of new roads and the low rates, a good part of its local traffic having been affected, yet its decrease in gross earnings was a fourth less than the Baltimore & Ohio's. In 1884 it earned \$1,818,000 less; in 1885, only \$1,126,000 less than the Baltimore & Ohio.

In working expenses the Erie's report is still more favorable, its having been reduced twice as much as the Baltimore & Ohio's. In 1884 the Erie's expenses were \$393,000 more than the Baltimore & Ohio's; in 1885 the Baltimore & Ohio's were \$310,000 more than the Erie's.

The effect on net earnings is that the Baltimore & Ohio's were reduced three times as much as the Erie's. The Baltimore & Ohio's net earnings were \$2,211,000 the larger last year, but only \$816,000 the larger this year.

The New York, Lake Erie & Western has made arrangements with Drexel, Morgan & Co. for the funding of its entire floating debt, including the past due coupons (three) of the second consolidated 6 per cent. bonds. The floating debt other than this interest (which it is hardly proper to call a "floating" debt), is to be retired by the proceeds of new bonds issued on the Long Dock Company property, which forms the New York terminus of the road, "which will enable the dock company to reimburse the railroad company for the large amount due the latter by the former." It is a surprise to learn that the Erie had any assets not already covered by a mortgage; but doubtless, some have been discovered, for the bankers have agreed to take the bonds, and they would not do that unless they had found the security sufficient. The Erie owns the stock of the Long Dock Company, and that stock is pledged as security for a loan, but that does not prevent the dock company from mortgaging its property.

The condition of the sale of the new dock bonds, however, is that the holders of the second consolidated and funded coupon bonds shall fund the three past-due coupons, and also that maturing June 1 next (12 per cent. in all), into a new 5 per cent. bond, secured by the funded coupons, and payable at par in 1890, or at 105 at the pleasure of the railroad company. The holders of the consolidated bonds will be encouraged to do this by having the coupon due Dec. 1 next paid in cash by Drexel, Morgan & Co., on surrender of the four coupons to be funded.

This seems a very ingenious way of rescuing the company from its present difficulties, and it will probably be acceptable to the bondholders. It must be remembered, however, that the relief is gained at the expense of a permanent increase of the fixed charges, which will begin to be felt a year from now, when interest must be paid on all the present debt, on the new issues of Long Dock bonds, the amount of which is not stated, and on the new funded coupon bonds, which will amount to something more than \$4,000,000. This requires that the profits of the railroad shall be larger hereafter than they have been heretofore. Doubtless, they will be larger than for two years past, but it is not at all sure that they can be made as large as in previous years, and the surplus over fixed charges has always been narrow since full interest became due. For this reason it is quite possible that a foreclosure and reorganization will not be prevented but only postponed by the new arrangement. The original vice of the last reorganization of this company was that it made the fixed charges dangerously great. The funding of the floating debt and the four second consol coupons will make them still greater. At the time of the reorganization, the Erie was one of two railroads between New York and Buffalo; now, it is one of four.

Another feature of the plan is that the control of the Erie property is preserved to the Erie stockholders wholly at the expense of the bondholders, and that by the increase of fixed charges these stockholders who control the property will have a still smaller chance than heretofore of getting any benefit from it, and so can have little interest in its legitimate management.

October Accidents.

Our record of train accidents in October, given on another page, contains brief accounts of 62 collisions, 55 derailments and 6 other accidents; a total of 123 accidents, in which 36 persons were killed and 134 injured.

Ten collisions and 7 derailments caused the death of one or more persons each; 10 collisions, 15 derailments and 1 other accident resulted in injury to persons, but not death. In all, 17 accidents caused death or fatal injury, while in 26 others there were lesser injuries; a total of 43 accidents, leaving 80, or 65 per cent. of the whole number, in which there was no injury to persons severe enough to be recorded.

The 62 collisions caused 25 deaths and 87 injuries; the 55 derailments killed 11 persons and injured 45, while in the 6 other accidents no person was killed and only 2 were injured.

Of the persons killed 19, and of those injured 55 were railroad employes, that class of persons thus furnishing 53 per cent. of the killed, 41 per cent. of the injured and 43½ per cent. of the whole number of casualties; an unusually small proportion.

As compared with October, 1884, there was an increase of 18 accidents, but a decrease of 3 in the number killed and of 36 in that of injured.

These accidents are classified as to their nature and causes as follows:

| COLLISIONS: | |
|---|------|
| Rear | 46 |
| Butting | 13 |
| Crossing | 3 |
| ..... | — 62 |
| DERAILMENTS: | |
| Broken rail | 9 |
| Broken frog | 1 |
| Broken bridge | 1 |
| Spreading of rails | 8 |
| Broken wheel | 5 |
| Broken axle | 5 |
| Broken truck | 1 |
| Broken brake-beam | 2 |
| Broken train or coupling | 1 |
| Accidental obstruction | 1 |
| Cattle on track | 3 |
| Wash-out | 1 |
| Misplaced switch | 6 |
| Mail removed for repairs | 2 |
| Malicious obstruction | 1 |
| Purposely misplaced switch | 1 |
| Unexplained | 7 |
| ..... | — 55 |
| OTHER ACCIDENTS: | |
| Boiler explosion | 1 |
| Broken parallel-rod | 2 |
| Broken wheel not causing derailment | 1 |
| Cars burned while running | 2 |
| ..... | — 6 |
| Total number of accidents | 123 |

No less than ten collisions were caused by trains breaking in two; six are attributed to fog; four to the failure to use signals promptly; three to misplaced switches; two to cars blown or run out of siding upon the main track; two to the wreck of a preceding train, and one to mistake or misunderstanding of orders.

A general classification of these accidents may be made as follows:

| Defects of road | Collisions. | Derailments. | Other. | Total. |
|-------------------------------|-------------|--------------|--------|--------|
| Defects of equipment | 10 | 14 | 4 | 28 |
| Negligence in operating | 42 | 8 | — | 50 |
| Unforeseen obstructions | 10 | 5 | 2 | 17 |
| Maliciously caused | — | 2 | — | 2 |
| Unexplained | — | 7 | — | 7 |
| Total | 62 | 55 | 6 | 123 |

Negligence in operating is thus given as the general cause of 41 per cent. of all the accidents, defects of road causing 15½ and defects of equipment 23 per cent.

A division by classes of trains and accidents is as follows:

| Accidents: | Collisions. | Derailments. | Other. | Total. |
|--------------------------------|-------------|--------------|--------|--------|
| To passenger trains | 7 | 15 | 3 | 25 |
| To a pass. and a freight | 10 | — | — | 10 |
| To freight trains | 45 | 40 | 3 | 88 |
| Total | 62 | 55 | 6 | 123 |

This shows accidents to a total of 185 trains, of which 42 (23 per cent.) were passenger trains, and 143 (77 per cent.) were freight trains.

Of the total number of accidents 70 are recorded as happening in daylight and 53 at night.

The only broken bridge recorded failed on account of the weakening or partial washing out of an abutment by high water; it appears to have been a wooden truss bridge on pile abutments.

The most marked feature of the month is the large number of collisions, half of the accidents being of that class. The breaking of trains caused no less than 10 of these, the largest number for which a cause is assigned.

The worst accident of the month was the triple collision on the Pennsylvania railroad, caused by the negligence of the operator in a block signal station. This accident was notable from the complete nature of the wreck, which utterly destroyed the rolling stock, and mangled the killed and injured in a terrible manner.

For the year ending with October the record is as follows:

| | Accidents. | Killed. | Injured. |
|-----------------|------------|---------|----------|
| November | 96 | 47 | 130 |
| December | 105 | 24 | 109 |
| January | 145 | 24 | 182 |
| February | 216 | 44 | 259 |
| March | 86 | 17 | 84 |
| April | 81 | 14 | 75 |
| May | 73 | 8 | 65 |
| June | 73 | 24 | 115 |
| July | 78 | 28 | 75 |
| August | 92 | 37 | 172 |
| September | 91 | 25 | 98 |
| October | 123 | 36 | 134 |
| Total | 1,248 | 328 | 1,498 |

| | | | |
|-----------------------------------|-------|-----|-------|
| Total, same months, 1883-84 | 1,224 | 384 | 1,809 |
| " " " " 1882-83 | 1,679 | 472 | 1,903 |
| " " " " 1881-82 | 1,376 | 401 | 1,496 |

The monthly average for the year was 104 accidents, 27

killed and 125 hurt. The yearly average for the four years was 1,382 accidents, 396 killed and 1,684 injured.

The averages per day were, for the month, 3.97 accidents, 1.16 killed and 4.32 hurt; for the year, 3.42 accidents, 0.90 killed and 4.10 injured.

The average casualties per accident for the month were 0.293 killed and 1.089 hurt; for the year they were 0.263 killed and 1.200 injured.

The month thus made a showing more unfavorable than the average, the number of accidents indeed having been exceeded in only two of the months of the year.

Grain Exports.

Though the grain exports last October were small, they were in the aggregate not much less in quantity than in the corresponding month of last year, though as a much larger proportion was corn this year, the reduction in value was considerable. For five years the aggregate bushels and values in October have been:

| | 1881. | 1882. | 1883. | 1884. | 1885. |
|---------------------------|--------------|--------------|--------------|--------------|--------------|
| Flour, bbls. | 235,497 | 639,543 | 771,286 | 881,091 | 86,674 |
| Wheat, bu. | 8,801,660 | 10,043,247 | 6,587,728 | 7,574,936 | 3,878,916 |
| Flour and wheat, bu. | 10,311,390 | 10,222,563 | 10,058,115 | 11,341,865 | 7,508,839 |
| Corn, bu. | 4,971,661 | 1,065,772 | 4,845,371 | 1,104,617 | 4,413,954 |
| Oats, bu. | 16,678 | 32,120 | 46,335 | 1,084,863 | 1,265,434 |
| All grains, bu. | 13,999,859 | 14,115,633 | 15,472,852 | 14,387,352 | 13,330,559 |
| Value | \$14,839,914 | \$16,362,982 | \$14,651,530 | \$11,772,506 | \$10,225,347 |

Thus the total number of bushels exported in October this year was 7 per cent. less than last year, 14½ per cent. less than in 1883, and 4½ per cent. less than in 1881, when they were the smallest for several years. It will be noticed that the decrease in wheat is great as compared with every year, but that the flour exports were larger than ever before except last year, and but 9 per cent. less than then; while the wheat exports are 34 per cent. less.

The exports of grain other than wheat and flour were larger this year than in any other of the five, due largely to exports of oats many times as great as in any year before 1884—a new development of the export trade; but as it is the cheapest grain, it does not add in proportion to the grain export values. These were 13 per cent. less this year than last, 30 per cent. less than in 1883, and 33½ per cent. less than in 1882. The decrease seems very large, but it is much smaller than in any of the three months previous, the values of the breadstuffs exports in each of the last four months and for the four months having been:

| | July. | August. | September. | October. | Four months. |
|------------|--------------|--------------|--------------|--------------|--------------|
| 1881 | \$19,976,767 | \$25,547,521 | \$19,917,433 | \$14,839,914 | \$80,311,635 |
| 1882 | 16,468,369 | 28,361,330 | 24,062,001 | 15,332,082 | 84,444,372 |
| 1883 | 10,179,567 | 18,816,129 | 16,192,060 | 14,551,230 | 59,849,216 |
| 1884 | 12,371,754 | 10,519,044 | 13,631,338 | 11,772,506 | 64,294,662 |
| 1885 | 8,714,365 | 7,739,956 | 9,367,700 | 10,225,347 | 35,717,368 |

Thus compared with last year the decrease of \$1,547,000 in October seems very small, following as it does a decrease of \$4,564,000 in September, of \$8,809,000 in August, and of \$3,657,000, in July. This, however, is only in part due to an increase in October this year over previous months, but more to a decrease from previous months in October last year.

The value for the four months this year is one-third less than last year and 58 per cent. less than in 1882.

The wheat exports are usually very much larger in the last half than in the first half of the year, and fall off after October, though they are sometimes quite large in November and December. When the winter wheat crop is large, the exports of the four months from July to October are sometimes more than half the exports of the entire crop year. The smallness of the wheat exports during this period this year was doubtless due to the failure of the winter-wheat crop. The flour exports, naturally, vary less from month to month, the mills aiming to keep busy throughout the year, and to market their flour as fast as it is made.

The corn exports are not usually very large until spring, but this year they were largest in January and February, and they may be again this winter. There has not been a heavy fall export of corn since 1880. Then in the four months ending with October 40,108,349 bushels were exported, against 15,352,688 bushels this year and 6,785,725 last year. Ordinarily corn exports fall off after July, but this year they were larger in October than in any previous month since May. The large crop of last year evidently has gone largely to supply the shortage of previous years, since it has not resulted as yet in what can properly be called large exports. For the ten months ending with October these have been, for ten years, in bushels:

| Year. | Bushels. | Year. | Bushels. |
|------------|-------------|------------|------------|
| 1876 | 60,542,235 | 1881 | 66,418,493 |
| 1877 | 67,769,495 | 1882 | 12,454,928 |
| 1878 | 77,333,408 | 1883 | 56,727,896 |
| 1879 | 72,861,156 | 1884 | 25,451,780 |
| 1880 | 102,346,375 | 1885 | 54,322,579 |

Thus, though the exports this year were more than twice as great as last year, and more than four times as great as in 1882, they were less than in any other year since 1875—10 per cent. less than in 1876 or 1877, 30 per cent. less than in 1878, and 47 per cent. less than in 1880.

As the stocks of old corn in farmers' hands are now probably up to the average (the number of hogs fattened on the crop of 1884 having been less than in previous years of large crop crops), and as the new crop is large, and as there is no where, abroad or at the seaports, a large stock of corn now, the conditions seem favorable for a return to the large exports of the four years from 1878 to 1881. There is, no doubt, a larger home demand now than then, and whether Europe will take all we can spare is as yet not clear. But it will require comparatively but little demand to absorb our surplus. Our largest exports in one year, including corn meal, were 119 millions of bushels, and this left 1,640 millions for the consumption of 51 million people. Europe, with six times the population, might, it would seem, take one eighth of that quantity, or 200 million

bushels, without feeling it, the grain going there chiefly, as here, as food for animals. It is at least possible that there will be very large corn exports for a year to come, and if so the winter grain movement may be larger than usual, in spite of the light wheat crop, which does not usually make a very important figure (except in the shape of flour) after December.

Chicago through rail shipments eastward for the week ending Nov. 21, including only flour, grain and provisions this year and last, but freight of all kinds in previous years, have been in tons:

| | 1880. | 1881. | 1882. | 1883. | 1884. | 1885. |
|--------|--------|--------|--------|--------|--------|-------|
| 53,096 | 49,421 | 50,404 | 48,390 | 57,089 | 34,525 | |

Thus the shipments last year were much less than in any previous year and 40 per cent. less than last year.

The total shipments and the percentage going by each railroad in each of the last six weeks have been:

| | Oct. 17. | Oct. 21. | Oct. 31. | Nov. 7. | Nov. 14. | Nov. 21. |
|-----------------|----------|----------|----------|---------|----------|----------|
| Tons: | | | | | | |
| Flour | 6,952 | 4,412 | 3,644 | 3,915 | 4,571 | 4,248 |
| Grain | 27,157 | 14,628 | 15,259 | 14,680 | 15,114 | 18,646 |
| Provisions | 4,681 | 6,139 | 7,806 | 8,991 | 9,695 | 11,593 |
| Total | 38,790 | 25,179 | 26,709 | 27,586 | 29,890 | 34,525 |
| Per cent.: | | | | | | |
| C. & Grand T. | 2.9 | 9.3 | 7.9 | 11.4 | 10.7 | 8.6 |
| Mich. Cen. | 32.5 | 17.7 | 21.6 | 18.4 | 19.8 | 20.0 |
| Lake Shore | 18.1 | 13.4 | 14.2 | 15.1 | 13.5 | 13.8 |
| Nickel Plate | 5.5 | 7.4 | 8.1 | 7.9 | 11.1 | 12.4 |
| Ft. Wayne | 21.6 | 29.2 | 19.8 | 21.0 | 17.5 | 19.8 |
| O., St. L. & P. | 10.0 | 12.0 | 13.1 | 11.4 | 15.6 | 14.4 |
| Balt. & Ohio | 4.9 | 6.0 | 8.1 | 7.4 | 7.9 | 6.2 |
| Ch. & Atlantic | 4.5 | 5.0 | 7.2 | 7.4 | 3.9 | 4.8 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

There was an increase last week of 4,635 tons (15.4 per cent.) compared with the previous week, in the total shipments, which considering the advance of rates announced or this week, was but small. The flour shipments decreased 7 per cent. the grain shipments increased 23½ per cent., and the provision shipments increased 19½ per cent. and were really larger than when the total shipments were greatest, about two months ago.

The change in percentages are numerous, but usually not very great. The Chicago & Grand Trunk's percentage is the smallest for three weeks; the Nickel Plate's the largest for many weeks; the three Vanderbilt roads together had 46.2 per cent. of the whole; the two Pennsylvania roads, 34.2.

The rules under which through shipments at old rates are accepted have been made so strict that we should not expect that the bulk of the shipments during this week should be moved at old rates; and if not, the shipments will probably fall off. Navigation is so very near its close, however, that shipments probably cannot long remain as low as they have been since the advance to 20 cents.

The exports of provisions (beef, pork and dairy products) in October were 9 per cent. less in value this year than last; and for the ten months ending with October were slightly greater this year. For October there is a large increase in salt beef, but a decrease in fresh beef and tallow, and a large decrease in butter and cheese. The exports of pork products, which make about three-fifths of the total value this year, have been in October for nine years, in millions pounds: 1877. 1878. 1879. 1880. 1881. 1882. 1883. 1884. 1885. 45.2 63.2 76.4 88.0 65.2 24.7 52.9 42.1 57.5

Thus the exports this year were 37 per cent. more than last year and the largest for four years, but less than any of the four years from 1878 to 1881 and 34 per cent. less than in 1880.

For the ten months ending with October, the exports have been, in millions of pounds:

| | | | | | | | | |
|-------|-------|-------|---------|-------|-------|-------|-------|-------|
| 1877. | 1878. | 1879. | 1880. | 1881. | 1882. | 1883. | 1884. | 1885. |
| 584.4 | 903.1 | 965.0 | 1,066.6 | 893.5 | 527.7 | 634.8 | 485.0 | 644.7 |

Here again we find the exports this year the largest for four years, and 39 per cent. more than last year, but much less than in any year from 1878 to 1881, and 40 per cent. less than in 1880, when they were largest.

While our railroads have had an exceptionally small wheat traffic this year, in Austria the movement westward from Hungary has been exceptionally large, and that by all routes—direct by rail, up the Danube, and to the sea at Fiume. Wheat goes largely to Switzerland, barley in great quantities to South Germany, to the Rhine, Holland and England. A large amount of flour goes to Great Britain and France, and smaller quantities are shipped to Switzerland and South Germany.

An experimental shipment of ore for the Bethlehem Iron Company has been made recently in a manner which illustrates one of the many ways in which it is sought to obtain return freights. One of the large lake steamers of the Lehigh Valley Transportation Company was loaded with anthracite coal for Duluth from the docks of the Lehigh Valley Coal Company at Buffalo. Freights on anthracite are sometimes lower to Duluth than to Chicago, because it is more difficult to get up loads to Duluth for the vessels coming down with grain. In this case the coal was discharged at Duluth and a deck load of flour taken on board. The run up to the terminus of the Duluth & Iron Range road on the lake is only about 40 miles, and there the cargo of iron ore was taken on board, and the steamer started on her return trip. To discharge the deck load of flour at Buffalo caused a delay of only a few hours, and the steamer then proceeded through the Welland Canal to Fairhaven, where the ore was discharged into coal cars which had delivered their freight on the dock at that place. The shipment was an experimental one, for the iron company had not yet fully tested the merits of the ore, but if it should prove to be as good as it is claimed to be, the railroads and the transportation company can unquestionably make a rate low enough to enable frequent shipments by this route, the conditions for which are very like

those for Marquette shipments, there being a large down traffic and but little up, so that very low rates are accepted for cargoes from Buffalo to Lake Superior ports.

The movement inaugurated by the Civil Engineers' Club of Cleveland, to hold a convention of representatives of the various engineering organizations at Cleveland to consider the question of the relations of army and civil engineers in the government service, has met with considerable success. The assured delegates at this date, from the various local organizations, are as follows:

St. Louis, J. A. Ockerson; Chicago, L. E. Cooley; Cleveland, John Eisenmann; St. Paul, H. S. Stevens; Minneapolis, Wm. A. Pike; Southern, M. C. Kollock; Michigan, J. B. Davis; Philadelphia, E. L. Corthell; Indiana, Walter A. Osmer; Missouri, T. J. Lowry.

The Pittsburgh and Boston societies, with seven others, are considering the question of sending delegates, with strong probability that some of them will do so. The American Society of Civil Engineers has declined to do so, not on the ground of lack of sympathy with the movement, but because the national character of the organization made it inexpedient that it should as a body take any action in questions affecting the personal interests of any class of its membership.

The Board of Trade reports of railroad accidents in Great Britain give the numbers of persons killed and injured in "shunting," mostly from coupling cars, as follows:

| | 1884. | 7 years, 1878-84. | Yearly average. |
|----------------------------|------------|-------------------|-----------------|
| Killed | 130 | 1,081 | 154 |
| Injured | 1,305 | 9,256 | 1,322 |
| Ratio of killed to injured | 1 to 10.05 | 1 to 8.55 | 1 to 8.55 |

None of our state reports show more than 5½ injuries to one death, and some less than two injuries to one death; but the Baltimore & Ohio Relief Association, which is likely to record every hurt, because it provides the surgeons for employees without charge, reports 44.56 injuries of all kinds to every accidental death. Doubtless in England many injuries are not reported at all which are yet severe enough to cause an employee to have them treated when he belongs to such an organization as the Baltimore & Ohio Relief Association. Against the 130 persons killed in England, as above, we have estimated recently that 459 men were killed in coupling cars in this country. This amounts to one to 1,010,000 freight-train miles in Great Britain; in this country, by our estimate, one to 765,000 freight-train miles. A larger proportion of the hauls are short there, and the cars are smaller, which tends to make more coupling in proportion to mileage, but on the other hand the average train is probably considerably smaller than here.

The "Amalgamated Society of Railway Servants" has appropriated \$500 for prizes for couplers fulfilling certain conditions, and is endeavoring to obtain the use of goods wagons and of track on which to test them—almost the first sign of dissatisfaction with the existing mode of coupling in England. In Germany, years ago, the German Railroad Union offered a prize for an improvement in couplers, which are by no means the same as ours.

The statistical department of the Austrian Ministry of Commerce has just published an important collection of railroad statistics, under the title "Statistics of European Railroads for the year 1882, with the leading results for 1883." It is really the first international work of its kind. It has complete official returns for about 80,000 miles of railroad, in Austria, Belgium, Denmark, France, Germany, Holland, Italy, Norway, Roumania, Russia, and Switzerland—together with such figures as could be obtained from other parts of Europe. It is divided into sections as follows: I., Length, Construction, Grades and Curves; II., Capital and Subsidies; III., Equipment; IV., Traffic—Passenger and Freight; V., Financial Results; VI., Employees; VII., Pensions and Insurance; VIII., Accidents.

Long-drawn-out resolutions of thanks for "hospitable courtesies" are not particularly novel, being the usual thing after "annual meetings" and conventions; but a resolution of thanks taking up eleven pages of fine type, ornamented with woodcuts and bound, without other matter, in a showy cover, is something which we have not chanced to see before receiving a neat pamphlet from the Traveling Passenger Agents' Association, ornamented on the cover with a brilliant red and gold fac-simile of the badge used by them at their last annual convention, and the whole of the interior filled with one prolonged outburst of resolutionary gratitude, thanking most of the people of the New England states by name, "so far as words are capable of performing that pleasant duty," as the passenger agents delicately put it, with more literal truth than is common. Among those singled out for especial gratitude are—all the railroad, street-car, steamboat and stage-line corporations (perhaps with some few omissions which we have not detected); all their employees who were in immediate charge of "the courtesies extended"; all the hotel proprietors, and the usual crowd of "citizens" at the end of the procession.

The railroad companies which have lines between Liverpool and Manchester, having failed to prevent the passage of the act authorizing the construction of a ship canal between the two places have reduced their rates apparently with the expectation of preventing the construction of the canal, which is promoted chiefly by those who pay freights between the two places, and who will probably be satisfied if they secure a considerable reduction of rates. One of the grievances was that the old rates combined charges for collection and delivery with the transportation charge. For the collection at Manchester and transportation, the charge

on manufactured goods on bales and cases, which form the bulk of the freight from Manchester to Liverpool, was 9s. 2d. per ton, equal to 10.3 cents per 100 lbs., the distance being 30 miles. In this country the cartage would cost a large part of this sum. The new rates are 1s. 2d. per ton for cartage in Manchester and 6s. 10d. for transportation to the Liverpool station—making the whole 8s., or 8½ cents per 100 lbs. for the whole, a reduction of 16 per cent. A proportionate reduction is made in the rates from other manufacturing towns of Lancashire and Yorkshire.

A similar reduction is made on shipments in the other directions, the charge for cotton to Manchester being changed from 8s. to 7s. 2d. per ton. The same reduction of 10d. per ton is made to the other more distant towns, leaving the differences in rates the same as heretofore. There is also a change with respect to the time goods may be left at the station before removal. Heretofore there was no additional charge for warehousing when the goods were left for several days. Now after 48 hours there is a warehouse charge of 10d. per ton for a longer period, not exceeding one month, and 2d. per week thereafter.

On grain, in four-ton loads, received at certain specified Liverpool warehouses, 6s. 11d. is charged to Manchester, and on that received at other warehouses, 7s. 3d., with an extra charge of 5d. per ton for storage after 48 hours, for the first month or less.

There is probably nowhere in this country so great a railroad traffic over so short a distance as that between Liverpool and Manchester, but in nature it is something like that between Boston and Lowell.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines is given in the current number of the *Railroad Gazette* as follows:

Americus, Preston & Lumpkin.—Extended from Preston Ga., west to Richland, 9 miles.

Chicago & Northwestern.—On the Yankton Branch track is laid from Centerville, Dakota, 15 miles.

Houston, East & West Texas.—Extended northeast to the Sabine River, 7 miles.

Jacksonville, Tampa & Key West.—Extended from Seville, Fla., south 8 miles.

Missouri Pacific.—The *Rooks County Branch* is completed from Alton, Kan., to Stockton, 18 miles.

Pennsylvania.—The *Schuylkill Division* is extended north by west to Hamburg, Pa., 6 miles.

Waterloo & Seneca Falls.—Completed from Seneca Falls, N. Y., west to Waterloo, 5 miles.

Wheeling & Lake Erie.—Extended from Sherrodsville, O., south to Bowerstown, 7 miles.

This is a total of 75 miles on 8 lines, making 2,439 miles thus far reported for the current year. The new track reported to the corresponding date for 14 years has been:

| | Miles. | | Miles. |
|------|--------|------|--------|
| 1885 | 2,439 | 1878 | 2,120 |
| 1884 | 3,425 | 1877 | 1,964 |
| 1883 | 5,717 | 1876 | 2,153 |
| 1882 | 9,255 | 1875 | 1,176 |
| 1881 | 6,983 | 1874 | 1,731 |
| 1880 | 5,443 | 1873 | 3,456 |
| 1879 | 3,263 | 1872 | 6,559 |

These figures include main track only, second tracks and sidings not being counted.

TRADE CATALOGUES.

The Turning of Steel-tired Car Wheels. The Niles Tool Works, Hamilton, Ohio.

This remarkably well-written little treatise on an important subject will well repay perusal. It presents arguments for a novel method of returning steel-tired car wheels, and describes and illustrates a peculiar lathe for that purpose, lately devised by the Niles Tool Works.

Catalogue of Wood-Working Machinery, Goodell & Waters, Philadelphia.

This catalogue contains a large number of illustrations of various kinds of wood-working machinery, in some of which the makers have lately introduced important improvements, which are here illustrated and described for the first time.

TECHNICAL.

Locomotive Building.

The Dickson Manufacturing Co., in Scranton, Pa., has taken an order for two light switching engines for the Brooklyn Bridge.

The Chicago, Rock Island & Pacific shops in Chicago are building six new passenger engines, with 17 by 24 in. cylinders, for the road.

The Car Shops.

In a notice of the Keystone Car Spring Works in this column last week, the accidental omission of a figure made us say the graduated bolster springs made at those works are in use under 3,000 cars; it should have been 30,000 cars, making over 120,000 sets of the springs now in use.

The Pennsylvania Car Works of S. R. & H. Baker, at Latrobe, Pa., have been started up, having received several orders.

The Harrisburg Car Co., in Harrisburg, Pa., is building 200 freight cars for the Lehigh & Hudson River road.

The Terre Haute Car Works, in Terre Haute, Ind., last week delivered 40 coal cars to the Chicago & Eastern Illinois road.

The Indianapolis Car Works, in Indianapolis, Ind., are building 300 box cars for the Union Pacific road.

The Pennsylvania Railroad shops at Altoona have received orders to build 600 box and gondola cars for the road.

The Pullman Car Works, at Pullman, Ill., have received an order for 20 passenger cars for the Fremont, Elkhorn & Missouri Valley road.

Bridge Notes.

The Morse Bridge Co., in Youngstown, O., has a number of orders on hand and is running its works overtime.

The Phoenix Bridge Co., in Phoenixville, Pa., is reported

to have taken the contract to build the projected bridge over the Hudson River at Storm King Mountain.

Iron and Steel.

It is reported that the extensive works of the Calumet Steel Co. at South Chicago will shortly be started up.

Katabdin Furnace at Katabdin, Me., went into blast last week, having been entirely rebuilt.

The Edgar Thomson Steel Co. is building an additional blast furnace at Braddock, Pa., making the sixth there.

The Twin City Forging Co., a new organization, has leased the Iron City Forge at Sharpsburg, near Pittsburgh, and will start up the works.

Manufacturing and Business.

Messrs. Pedrick & Ayer, proprietors of the L. B. Flanders Machine Works of Philadelphia, report a growing increase in orders for special tools for railroad repair shops, inquiries being very numerous. They have recently shipped their patent portable valve seat rotary planing machines to the Baltimore & Ohio, the Lehigh Valley and the Utica & Black River roads; patent portable locomotive cylinder boring machines to the Atchison, Topeka & Santa Fe; radius link plainer at attachment to the Savannah, Florida & Western; patent portable crank pin machine to the Boston & Albany; Otto's patent flue cleaning machine to the Pittsburgh & Lake Erie, and have other orders on file. Their portable cylinder boring machines for boring steam engine cylinders, etc., in place are some of them in almost daily use. Their specialty of repairing of Corliss engines keeps the force in this department so busy that they will be obliged to put on more hands to meet the demands.

Mr. A. L. Rowe, who has for some time represented the Mississippi Glass Co., of St. Louis, has been chosen General Manager of that company.

The Rail Market.

Steel Rails.—Prices continue firm, and although comparatively few sales are reported this week, quotations are still from \$33@35 per ton at mill, and there is apparently no disposition on the part of makers to reduce prices.

Rail Fastenings.—Spikes are quoted nominally at 2 cents per lb. in Pittsburgh; track-bolts at 2.60@2.85, and splice-bars at 1.60@1.70 cents.

Old Rails.—The market for old iron rails is irregular, and quotations vary from \$17@18 per ton at tide-water. Old steel rails are quoted at \$17@17.50 per ton in Pittsburgh, with light supply.

British Rail Exports.

For the month of October and the ten months then ending the exports from Great Britain are reported as follows by the Board of Trade, in tons of 2,240 lbs.:

| | October. | | | Ten months. | | |
|-------------------|----------|--------|--------|-------------|---------|---------|
| | 1882. | 1884. | 1885. | 1883. | 1884. | 1885. |
| Iron rails..... | 24 | 7 | 2,509 | 7 | 2,509 | 7 |
| Steel rails..... | 5,575 | 351 | 130 | 50,877 | 16,469 | 5,201 |
| Total..... | 5,599 | 351 | 130 | 59,470 | 16,476 | 5,201 |
| To all countries: | | | | | | |
| Iron rails..... | 798 | 960 | 1,740 | 22,000 | 11,707 | 13,003 |
| Steel rails..... | 38,936 | 30,800 | 30,159 | 638,417 | 401,006 | 426,706 |
| Total..... | 39,734 | 40,760 | 31,899 | 660,417 | 472,713 | 439,709 |

There were no exports to this country in June, July or August, and 228 tons in September, against 130 in October—practically none. The exports to other countries in October were one-fifth less than last year, and three-eighths less than in 1883; for the ten months they were only 4½ per cent. less than last year, but were 25 per cent. less than in 1883. Of the total exports in October no less than 45 per cent. went to India, which has also taken one-third of the exports for the ten months; Canada and Australia each about 14½ per cent., the Argentine Republic coming next with 6 per cent. (26,473 tons). India's takings have been twice as great as last year, and enough for about 1,400 miles of track.

St. Louis Engineers' Club.

The club met in St. Louis, Nov. 4, at Washington University, with President Moore in the chair and 12 members present. Mr. Thos. M. Math was elected a member. Mr. Wm. B. Knight, of Kansas City, Mo., was proposed for membership.

A paper by Mr. C. W. Clark was then read, entitled "Notes on the Influence of Inclination of the Limb and of the Axis of a Theodolite on the Measurement of Horizontal Angles," and discussed at length by Prof. Johnson.

In the general discussion, Mr. Hill gave the result of some tests of cement and sand bricks, mixed 4 of sand to 1 of cement. They were 26 days old and averaged about 125 lbs. per square inch in compression. Mr. Russell gave an instance where common clay stood 135 lbs. per square inch in tension; various other subjects were commented upon.

The next meeting of the Club will be held at the Mercantile Library.

Engineers' Club of Philadelphia.

A business meeting was held in Philadelphia, Nov. 7, Mr. Henry G. Morris in the chair. The following new members were elected: Joseph B. King, John W. Campbell, Wm. P. Craighill, R. R. Bridges, Jr., George E. Datesman, Allan Cox, Henry E. Tripler, J. H. Covode, John Wilson, Pedro G. Salom, Theodore Low, Emile Low, Jacob B. Rohrer, Sutherland M. Prevost and Charles S. Churchill.

Mr. E. L. Cortell was chosen a delegate to the conference at Cleveland, in relation to the standing of Civil Engineers in the government service.

The thanks of the Club were presented to Mr. T. Roney Williamson, member, for his services in designing and superintending the arrangement of the new house.

Mr. F. H. Bowen, Jr., presented a description of the Albo-Carbon Light, illustrated by a chandelier which had been placed in operation in the room. The Albo-Carbon light is an English invention. The light is obtained from the combustion of illuminating gas, such as coal, oil and water gas, with albo-carbon (naphthalene) in air. The latter is placed in a spherical reservoir, in which are several tubes, communicating with the outside gas supply and with the burner. A plate, connected with the reservoir, extends over the generator burner and serves to receive and conduct the heat to the reservoir.

Mr. James Christie presented a paper upon "The Adaptation of Steel to Structural Work." The price of steel has now fallen so low, compared with iron, that its increased use will be actively stimulated as the building industries revive. The grades and properties of the steels are so distinct and various, that opinions differ much as to the adaptability of each grade for a special purpose. Hitherto engineers have favored open-hearth steel on account of uniformity, but recent results obtained from Bessemer steel tend to place either make on equality. The seeming tendency is to specify what the physical properties shall be, and not how the steel shall be made. For boiler and ship plates the mildest and most ductile steel is favored. For ship frames and beams a harder steel, up to 75,000 lbs. tenacity, is frequently used. For tension members of bridges, steel of 65,000 to 75,000 lbs. tenacity is usually specified, and for compression members, 80,000 to 90,000 lbs. In the Forth Bridge, compression steel is limited to 75,000 to 82,000 lbs. Such a marked advance

occurs from the use of high tension steel in compression members, and the danger of sudden failure of a properly made strut is so little, that future practice will favor the use of hard steel in compression, unless the material should prove untrustworthy. In columns, even as long as diameters, steel of 90,000 lbs. tenacity will exceed the mildest steel 35 per cent. in compressive resistance. The present uncertainty consists largely as to how high tension steel will endure the manipulation usual with iron without injury. A few experiments were recently made by the writer on riveted struts of both mild and hard steel, which had been purchased, straightened and riveted, as usual with iron, but no indication of deterioration was found. Steel castings are now made entirely trustworthy for tensile working stresses of 10,000 to 15,000 lbs. per square inch. In some portable machinery, an intermittent tensile stress is applied of 15,000 lbs., sometimes rising to 20,000 lbs. per square inch of section, without any evidence of weakness.

The Secretary presented, for Maj. H. W. Clarke, a Table of Chains, Reduced to Feet, for the Reference Book.

Mr. Rudolph Hering read some interesting extracts from a report of a Committee of the City Councils of Philadelphia, made in 1801, on the first works built to supply the city with water from the Schuylkill River, the pumping station of which was at Centre Square, on the site of the present City Hall.

Mr. Henry G. Morris exhibited a fine specimen of a copy of tracing in blue lines on white ground.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Boston & Albany, annual meeting, at the Meionnon in Boston, at 11 a. m. on Dec. 9.

Boston & Maine, annual meeting, at the City Hall in Lawrence, Mass., at 10:30 a. m., on Dec. 9.

Eastern, annual meeting, at the passenger station in Boston, Dec. 9.

New York & New England, annual meeting, at the office in Boston, Dec. 9.

Richmond & Petersburg, annual meeting, at the office in Richmond, Va., Dec. 1.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Connecticut River, 4 per cent., semi-annual, payable Jan. 1, 1886, to stockholders of record on Dec. 16.

Lehigh Coal & Navigation Co., 2½ per cent., semi-annual, payable Dec. 8, to stockholders of record on Nov. 27.

Northern (New Hampshire), 3 per cent., semi-annual, payable Dec. 1.

North & West Branch (leased to Pennsylvania Railroad Co.), 3 per cent., semi-annual, payable Dec. 1.

Wilmington & Weldon, 4 per cent., semi-annual, payable Jan. 16.

Railroad and Technical Conventions.

Meeting and conventions of railroad associations and technical societies will be held as follows:

The Master Car-Builders' Club will hold its regular monthly meetings through the winter at the rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month.

The New England Railroad Club will hold its monthly meetings at its rooms in the Boston & Albany passenger station, in Boston, on the evening of the second Wednesday in each month.

The Western Railway Club will hold its regular monthly meetings at its rooms, No. 103 Adams street, in Chicago, on the third Wednesday in each month.

Foreclosure Sales.

The New York, West Shore & Buffalo road was sold at public sale in Newburg, N. Y., Nov. 24, in pursuance of the decree of foreclosure granted by the New York Supreme Court. When the Referee opened the proceedings, notice of several claims, was filed by interested parties, the principal ones being those of the New York, Ontario & Western Co. and of the North River Construction Co. The sale then proceeded and the property was bid off for \$22,000,000, to Mr. J. Pierpont Morgan, representing the committee which has had charge of the reorganization. No opposition was made and there was no other bid. The reorganization of the company and the transfer of the road to the New York Central, as lessee, can now proceed as soon as the sale is confirmed by the Court.

National Railroad Agents' Association.

The Minnesota branch of the National Railroad Agents' Association was organized at Owatonna, Minn., Nov. 19. J. C. Downing, President of the National association, was present and assisted in the organization. The object and aims of the association are to render to the railroad companies the best standard of agents by improving the efficiency of the service. The following officers were elected: President, C. Van Campen, Rochester; Vice-President, G. F. Talmadge Hastings; Secretary, H. H. Herrick, Dover; Treasurer, J. R. Pheaney, Owatonna. The next meeting will be held in St. Paul, Jan. 11, 1886.

Southern Association of General Passenger & Ticket Agents.

The meeting of this association, called at 46 Bond street, New York, on Nov. 10, was attended by the following named members: Messrs. L. S. Brown, R. B. Cooke, T. M. Emerson, L. T. Myers, M. Slaughter, C. A. Taylor, G. A. Whitehead, B. W. Wrenn, and Mr. Pile, representing Mr. J. R. Wood.

There being no quorum present, the following resolution was adopted:

Resolved, That this meeting do now adjourn to meet at the H. J. Kimball House, Atlanta, Ga., at 3 p. m., Dec. 2, proximo.

The attention of members is called to the important objects of the next meeting, and they are earnestly requested to be present, so that definite action may be taken as to the formation of the Southern Passenger Committee.

ELECTIONS AND APPOINTMENTS.

Attica, Lockport & Lake Ontario.—At the annual meeting in Lockport, N. Y., Nov. 19, the following directors were elected: R. F. Stevens, F. C. Stevens, J. V. D. Loomis, B. W. Spencer, A. A. Smith, F. N. Trever, James Jackson, Jr., W. T. Ransom, Jesse Peterson, John Hodge, S. Park Baker, Charles Whitmore, O. W. Cutler.

Boston, Faversham Beach & Lynn.—At the annual meeting in Boston, Nov. 20, the old directors were re-elected, as follows: Edwin Walden, Edward Tyler, David H. Sweetser, Matthew

Bolles, Amos F. B. Breed, L. S. Judd, Isaac P. T. Edwards, Joseph W. Smith, Jesse Tirrell.

Bridgton & Saco River.—At the annual meeting in Bridgton, Me., Nov. 18, the old board of directors was re-elected, except that Samuel S. Fuller was elected in place of R. P. Burnham, who declined a re-election.

Chicago, St. Meinrad & Ohio River.—Mr. B. F. Westfall, of St. Louis, is President of this new company.

Fremont, Elkhorn & Missouri Valley.—Mr. W. T. Kelley is appointed Supervisor of Track of the Western Division, with headquarters at Gordon, Nebraska.

Hartford & Connecticut Western.—Mr. H. W. Elmer is appointed Roadmaster of the Eastern Division, from Hartford to Millerton.

Indianapolis, Peru & Chicago.—At the annual meeting in Indianapolis last week the following directors were elected: Solon Humphreys, V. T. Malott, A. L. Hopkins, C. B. Stuart, David Macy.

Memphis & Charleston.—At the annual meeting in Huntsville, Ala., Nov. 12, the following directors were chosen: John T. Martin, E. H. R. Lyman, C. S. Brice, Samuel Shethar, Samuel Thomas, J. J. McComb, New York; Henry Fink, C. M. McClung, C. M. McGehee, Knoxville, Tenn.; D. S. Williams, Nashville, Tenn.; Napoleon Hill, Memphis, Tenn.; R. H. Richards, Atlanta, Ga.; Addison White, Huntsville, Alabama.

Merrill & Abbottsford.—The directors of this new company are: H. W. Wright, W. A. Scott, R. B. Champagne, Merrill, Wis.; J. H. Cooleage, Eau Claire, Wis.; Fred Rietbrock, A. A. Krause, T. A. Malcom, Milwaukee.

Milton & North Mountain.—The office of this new company is at Milton, Pa.; the directors are: William A. Heinen, William B. Chamberlain, J. Woods Brown, Jr., D. W. Smith, William Weidhamer, T. S. Moorehead, John M. Caldwell and H. G. Cahill.

Newburg, Dutchess & Connecticut.—Mr. Gilman D. Holmes is appointed Master Mechanic and Master Car-Building, with office at Dutchess Junction, N. Y., in place of Wm. G. Van Buskirk, resigned.

New York, Lake Erie & Western.—At the annual meeting in New York, Nov. 24, the following directors were chosen: John King, John G. McCullough, J. Lowber Welsh, Cortland Parker, Henry H. Cook, William Libbey, William A. Wheelock, William Whitewright, George W. Quintard, Ogden Mills, William L. Strong, William B. Dinsmore, Morris K. Jesup, James J. Goodwin, William N. Gilchrist, Jacob Hays and Charles E. Loew. The only changes are the election of Mr. Morris K. Jesup and Charles E. Loew in place of Messrs. George M. Groves and James A. Raynor.

Oakland & Colby.—The directors of this new company are: R. W. Jenkins, Clay Centre, Kan.; Charles Monroe, Lawrence, Kan.; H. P. Dillon, Jacob Smith, G. W. Veal, A. L. Williams, L. S. Wilson, Topeka, Kansas.

Ogdensburg & Lake Champlain.—The following notice from President J. W. Hobart is dated Ogdensburg, N. Y., Nov. 12:

"Owing to the increased amount of work in the Freight Department of this company, the Freight and Passenger departments will be separated on Dec. 1. Mr. S. W. Cummings is hereby appointed General Passenger Agent, with office at St. Albans, Vt. All matters pertaining to Passenger Department should be addressed to him as above. Mr. Frank Owen will continue as General Freight Agent, with office at Ogdensburg, N. Y., and all matters pertaining to the Freight Department should be addressed to him there."

Mr. Cummings is also General Passenger Agent of the Central Vermont road.

Old Colony.—At the annual meeting in Boston, Nov. 24, the following directors were chosen: Charles F. Choate, Frederick L. Ames, Thomas J. Borden, John S. Brayton, Samuel C. Cobb, Uriel Crocker, Thomas Dunn, George A. Gardner, Charles L. Lovering, William J. Rotch, John J. Russell, Nathaniel Thayer, Royal W. Turner. The board subsequently re-elected the old officers.

Richmond, Fredericksburg & Potomac.—At the annual meeting in Richmond, Va., Nov. 18, the old officers were re-elected, as follows: President, J. P. Brinton; directors, Charles Chauncey, B. F. Newcomer, W. T. Walters, F. T. Willis.

Seaboard & Roanoke.—Mr. C. W. Walker is appointed Master Mechanic. Mr. D. W. Ballentine is appointed Master Car-Building. These appointments are made in place of Mr. M. Fendleton, deceased.

Texas Trunk.—At a meeting held in Dallas, Tex., Nov. 20, the following were chosen: President, John L. Henry, Dallas; Vice-President, Jules E. Schneider, Dallas; directors, T. L. Marsalis and Alexander Sanger, Dallas; W. W. Weigley, Philadelphia; F. L. Russ, W. G. Mowry, New York. After the election of the board, W. G. Mowry, of New York, was elected General Manager and Treasurer, and Wm. Gleason Secretary.

Toledo, Cincinnati & St. Louis.—Mr. H. A. Young has been appointed Superintendent of the Toledo Division, in addition to his duties as Chief Engineer. Mr. B. S. McLeod has been appointed Superintendent of the St. Louis Division, and will have charge of maintenance of way under the direction of the Chief Engineer. The office of Master of Trains has been abolished.

Topeka, Frankfort & Marysville.—The directors of this new company are: H. P. Dillon, Jacob Smith, G. W. Veal, A. L. Williams, L. S. Wilson. Office in Topeka, Kansas.

Valley of Virginia.—At the annual meeting in Staunton, Va., Nov. 16, the old board was re-elected, as follows: J. J. Allen, W. A. Anderson, Robert W. Burke, Henry Duvall, Osman Latrobe, Decatur H. Miller. The road is controlled by the Baltimore & Ohio.

Wilmington & Weldon.—At the annual meeting in Wilmington, N. C., Nov. 17, the following officers were chosen: President, Hon. R. R. Bridges; directors, W. T. Walters, B. F. Newcomer, H. B. Plant, H. Walters, A. J. De Rosset, W. H. Willard, George Howard, Donald McRae, E. B. Borden, J. P. McKay. Subsequently the following officers were elected: Secretary and Treasurer, J. W. Thompson; General Manager, H. Walters; General Superintendent, J. F. Divine; General Auditor, W. A. Riach.

PERSONAL.

—Mr. J. S. Wattles has resigned his position as General Roadmaster of the Fremont, Elkhorn & Missouri Valley and the Sioux City & Pacific roads.

—Mr. W. H. Spradlin, Chief Engineer of the new Chesapeake & Nashville road, was married in Scottsville, Ky., recently, to Miss Mary F. Rutland, of that place.

—Mr. William G. Van Buskirk has resigned his position as Master Mechanic and Master Car-Building of the Newburg,

Dutchess & Connecticut road, after 18 years of continuous service with the road.

—Mr. Thomas B. Morris, who died recently in Oakland, Cal., was a civil engineer of good standing. He was for some time connected with the Northern Pacific road, and had charge of the construction of the original Pacific Division of that road.

—Mr. W. H. King has resigned his position as Commissioner of the Central Passenger Committee. It is reported that he has been offered a position in the passenger department of the Louisville & Nashville, and also that he has been offered the position of General Passenger Agent of the Louisville, Evansville & St. Louis, and that he will accept one of those positions.

—Calvin Pratt, who served as civil engineer some years ago on the Atchison, Topeka & Santa Fe and the lines of the Oregon Railway & Navigation Co. and who has since been connected with several projected lines in California, disappeared recently from San Francisco, taking with him some \$14,000 obtained by forgery, it is charged. Dispatches were sent eastward to secure his arrest, but it is believed that he has escaped to Canada.

—Mr. R. Johnston Niven died in Southampton, England, Nov. 24. He was for many years a lawyer in New York, where he had a wide circle of friends. He was for many years Secretary of the New York & Harlem Railroad Co., and was also President of the Lebanon Springs Railroad Co., and afterward of the Harlem Extension Co. He retired from business in 1873, and of late years traveled much abroad in the hope of restoring his failing health.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

| Ten months to Oct. 31: | | | | |
|--------------------------|-------------|-------------|--------------|-------|
| | 1885. | 1884. | Inc. or Dec. | P. c. |
| Minn. & St. L. | \$1,438,453 | \$1,472,933 | D. \$34,480 | 2.3 |
| Nash., C. & St. L. | 1,739,712 | 1,963,161 | D. 203,457 | 10.5 |
| Net earnings..... | 711,132 | 848,624 | D. 137,492 | 16.2 |
| N. Y. & Sus. & W. | 908,605 | 849,249 | I. 59,356 | 6.9 |
| South Carolina..... | 916,212 | 968,265 | D. 52,053 | 5.4 |
| Nine months to Sept. 30: | | | | |
| C. I. St. L. & C. | \$1,732,817 | \$1,794,229 | D. \$61,412 | 2.3 |
| Net earnings..... | 625,653 | 639,567 | D. 13,914 | 2.2 |
| Denver & R. G. | 4,415,728 | 4,101,000 | I. 314,728 | 7.7 |
| Net earnings..... | 1,493,283 | 1,266,810 | I. 226,473 | 18.3 |
| N. Y. & P. & Ohio..... | 3,599,901 | 4,154,361 | D. 554,460 | 13.4 |
| Rome, Wat. & Og. | 1,233,563 | 1,243,541 | D. 9,978 | 0.8 |
| Month of September: | | | | |
| C. I. St. L. & C. | \$219,256 | \$250,987 | D. \$31,731 | 12.7 |
| Net earnings..... | 88,435 | 101,786 | D. 13,351 | 13.0 |
| Den. & R. G. | 508,694 | 521,957 | I. 13,263 | 2.6 |
| Net earnings..... | 223,908 | 244,565 | D. 20,657 | 8.9 |
| N. Y. & P. & Ohio..... | 483,718 | 526,525 | D. 42,807 | 8.8 |
| Rome, W. & Og. | 172,901 | 184,756 | D. 11,855 | 6.8 |
| Month of October: | | | | |
| Minn. & St. L. | \$185,627 | \$171,746 | I. \$13,881 | 8.1 |
| Nash., C. & St. L. | 191,846 | 203,737 | D. 11,891 | 5.8 |
| Net earnings..... | 76,065 | 80,363 | D. 4,298 | 5.3 |
| N. Y. City & N. | 44,397 | 34,020 | I. 10,377 | 30.5 |
| Net earnings..... | 13,314 | 1,116 | I. 12,198 | 10.8 |
| N. Y. & Sus. & W. | 105,086 | 99,058 | I. 6,028 | 6.1 |
| Net earnings..... | 49,737 | 44,878 | I. 4,859 | 10.8 |
| South Carolina..... | 134,961 | 157,352 | D. 22,391 | 14.3 |
| Texas & St. L. | 160,928 | 132,142 | I. 28,786 | 23.3 |
| Second week in November: | | | | |
| Buff. & Pitts. | \$29,760 | \$24,383 | I. \$5,377 | 22.3 |
| Chi. & Alton..... | 182,374 | 210,985 | D. 28,611 | 15.6 |
| Chi. & East. Ill. | 39,883 | 34,467 | I. 5,416 | 15.8 |
| Chi. & Nor'west..... | 531,800 | 462,200 | I. 69,600 | 15.0 |
| C. St. P. M. & O. | 148,100 | 137,600 | I. 10,500 | 7.3 |
| C. I. St. L. & C. | 47,938 | 47,878 | I. 60 | 0.1 |
| Illinois Central..... | 268,300 | 281,006 | D. 12,706 | 4.5 |
| Iowa lines..... | 39,000 | 40,107 | D. 1,107 | 2.7 |
| Louisv. & Nashv. | 296,145 | 279,185 | I. 13,940 | 4.7 |
| Mil. & Northw. | 11,815 | 10,011 | I. 1,804 | 18.0 |

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Coal.

Coal tonnages for the week ending Nov. 14 are reported as follows:

| | 1885. | 1884. | Inc. or Dec. | P. c. |
|-------------------------|---------|---------|--------------|-------|
| Anthracite..... | 836,863 | 910,789 | D. 73,926 | 8.1 |
| Eastern bituminous..... | 209,120 | 203,552 | I. 5,568 | 2.7 |
| Coke..... | 53,025 | 43,291 | I. 9,734 | 22.6 |

The demand for anthracite at tidewater is still active, although the continued mild weather has had a somewhat depressing effect.

Coke tonnages continue to show an increase, which may be supposed to indicate a gradually increasing demand from the iron trade.

Chicago coal receipts in October were:

| | 1885. | 1884. | Inc. or Dec. | P. c. |
|-------------------------|---------|---------|--------------|-------|
| Anthracite..... | 166,253 | 202,459 | D. 36,206 | 17.9 |
| Eastern bituminous..... | 69,716 | 41,891 | I. 27,825 | 66.3 |
| Ohio..... | 48,711 | 29,557 | I. 19,154 | 64.0 |
| Indiana..... | 78,207 | 74,070 | I. 4,137 | 5.6 |
| Illinois..... | 109,090 | 109,820 | D. 730 | 0.7 |
| Coke..... | 50,942 | 39,033 | I. 11,909 | 30.5 |

Total..... 522,919 496,830 I. 26,089 5.4

Of the anthracite receipts this year, 100,181 tons were by lake, and 66,072 tons by rail.

Pennsylvania Railroad coal tonnage for the week ending Nov. 14 was:

| | Coal. | Coke. | Total. | 1884. |
|-----------------------|---------|--------|---------|---------|
| Line of road..... | 167,958 | 50,501 | 218,459 | 222,907 |
| From other lines..... | 107,609 | 2,524 | 110,133 | 58,202 |
| Total..... | 275,567 | 53,025 | 328,592 | 281,109 |

Year to Nov. 14, 9,834,787 2,238,825 12,073,612 11,548,999

Increase for the week, 47,483 tons, or 14.9 per cent.; increase for the year, 524,613 tons, or 4.5 per cent.

Cotton.

Cotton movement for the week ending Nov. 20 is reported as follows, in bales:

| | 1885. | 1884. | Inc. or Dec. | P. c. |
|---------------------|---------|---------|--------------|-------|
| Interior markets: | | | | |
| Receipts..... | 188,044 | 166,545 | I. 21,499 | 17.2 |
| Shipments..... | 158,714 | 135,976 | I. 22,738 | 16.7 |
| Stock, Nov. 20..... | 309,261 | 229,539 | I. 79,722 | 34.7 |
| Seaports: | | | | |
| Receipts..... | 270,421 | 258,774 | I. 11,647 | 4.5 |
| Exports..... | 216,239 | 198,558 | I. 17,671 | 8.9 |
| Stock, Nov. 20..... | 778,082 | 801,316 | D. 23,234 | 2.9 |

The total movement from plantations for the crop year (from Sept. 1) to Nov. 20 are estimated at 2,671,924 bales, against 2,581,357 last year, 2,694,550 in 1883 and 2,582,787 in 1882.

Scandinavian Excursions.

The Chicago & Grand Trunk and the Erie roads and the Thingvall Steamship Line are doing much to advertise the resources of the golden Northwest. They organize about 12 excursions from here to Scandinavia, each of which assists several hundred people, who came here a few years ago as immigrants, to revisit their native shores. Yesterday an-

other of these excursions left here, the procession containing 45 omnibuses, 8 carriages, 2 brass bands, and 400 passengers. Nineteen cars were necessary to transport these people, two special trains being run. Three hours are allowed the excursionists at Niagara Falls. These people tell such glowing accounts of American prosperity that they always return with more immigrants, their relatives or their sweethearts.—Chicago Inter-Ocean, Nov. 20.

Passenger Rates.

The Chicago East-bound Passenger Committee, Nov. 19, agreed that rates from points west of Chicago via Chicago to Eastern points should be based on the standard rate of \$20 from Chicago to New York, though tickets from Chicago are sold at \$17. This is to prevent the cutting of rates on Chicago tickets by tickets of western issue on which large commissions have been paid.

A Curious Traffic.

The New London Northern, the Vermont Valley and the Rutland roads enjoy a small traffic in a new article of merchandise. It is sea sand, which is carried from Long Island Sound to Rutland, and there used in the great marble mills for sawing and surfacing, as it is more silicious than other kinds, and therefore cuts faster under pressure.—Boston Advertiser.

New England Railroad Earnings.

Reports of New England roads for the year ending Sept. 30 have been made as follows:

| | Earnings. | Expenses. | Net earnings. |
|------------------------------|-------------|-------------|---------------|
| Fitchburg..... | \$2,801,251 | \$2,146,960 | \$744,291 |
| 1883-84..... | 2,856,657 | 2,131,404 | 725,253 |
| Housatonic leased lines..... | 234,076 | 136,545 | 97,531 |
| 1883-84..... | 249,632 | 172,869 | 76,763 |
| New London Northern..... | 551,659 | 337,553 | 214,106 |
| 1883-84..... | 578,222 | 339,764 | 238,458 |
| Norwich & Worcester..... | 750,482 | 427,988 | 322,494 |
| 1883-84..... | 761,901 | 464,387 | 297,514 |

The Housatonic statement is for the leased lines in Massachusetts only, and does not include the line in Connecticut.

Lake Superior Iron Ore.

The Marquette Mining Journal of Nov. 21 says: "Our readers may be curious to know how the entire shipments from the four districts in the Lake Superior region for the current season compare with those of 1884 from the iron fields then ranking as producers. The figures can be given only approximately as yet; but they are close enough for all practical purposes. Last year at this date the lake output was as follows:

| | |
|-------------------------|-----------|
| Marquette district..... | 1,498,709 |
| Menominee..... | 880,807 |
| Vermillion..... | 62,124 |
| Total..... | 2,441,640 |

"This year a new district, the Agogebie, has begun producing ore. At date of our last reports from the several districts embraced in the Lake Superior region, their shipments for this season were as shown in the appended table.

| | |
|-------------------------|-----------|
| Marquette district..... | 1,369,040 |
| Menominee..... | 677,419 |
| Agogebie..... | 169,931 |
| Vermillion..... | 219,300 |
| Total..... | 2,375,720 |

"Or a total from the four districts now actively producing iron ore of 65,000 tons less than had been sent to market by lake at the corresponding stage in the season of 1884 from the three which were then producers. This establishes that the quantity of Lake Superior ore placed on the market this year will certainly not be in excess of last year's output, though one new field, the Agogebie, has in the meantime been opened up, and another, the Vermillion, has got fairly under way, having nearly quadrupled its last year's product."

Southern Railway & Steamship Association.

A meeting of the Executive Committee was held in Atlanta last week, at which it was stated that the reports of cutting had been much exaggerated. The meeting was harmonious and it is understood that arrangements were made for a settlement of difficulties.

The Fast Freight Line Agencies in Boston.

The following notice has been issued by Traffic Manager Mills, of the Boston & Albany road:

"By agreement with its western connections, the Boston & Albany Railroad Co. on Dec. 1, 1885, will take charge of the Boston and New England agencies of the Red, White, Blue and Canada Southern freight lines, and they will be represented by Mr. James Mills, agent, 232 Washington street, Boston, who will furnish, under the direction of the general freight agent, all authorized rates, issue bills of lading and give necessary information for the conduct of the west-bound freight traffic. The Boston & Albany Railroad Co., through its general passenger agent, will also represent the Lake Shore & Michigan Southern and Michigan Central railroads in the interest of the west-bound passenger traffic."

Colorado-Utah Association.

Negotiations have been concluded whereby the St. Louis & San Francisco road becomes a member of the Colorado-Utah Traffic Association, the membership to date from Nov. 16. The St. Louis & San Francisco is granted a stated amount as a subsidy that will be paid regularly whether the company earns that amount in the pool or not. This practically places the Association on a better footing than it has ever before enjoyed, and promises much for a permanent peace in Southwestern railway circles and in Colorado-Utah traffic.

A Central Pool.

For some time past the four roads covering the territory between Cleveland, Sandusky, Cincinnati, Indianapolis, Chicago and St. Louis, consisting of the Lake Erie & Western, the Indiana, Bloomington & Western, the Cincinnati, Indianapolis, St. Louis & Chicago, and the Cleveland, Columbus, Cincinnati & Indianapolis have been endeavoring to bring about an agreement upon a plan for a pooling of their earnings. The result of the discussions has been to come to a practical agreement upon the percentages to be awarded to each and the settlement of the general methods to be adopted to successfully carry out the scheme, which is to harmonize the interests of all the lines, that the cutting of rates shall be discontinued and prevented, and an interchange arranged of business between the roads which will make each a feeder to the others. It is understood that an agreement was finally reached at a conference held in New York last week.

The Boston Passenger Pool.

At the Boston meeting last week the roads represented included the New York Central, the Grand Trunk, the Boston & Albany, the Fitchburg, the Boston & Lowell, and the Central Vermont. The emigrant contract, which is not to be included in the Boston pool, was agreed to by all the lines represented. The question of first and second class traffic from Boston was taken up, and no agreement was reached, owing to the refusal of the Boston & Albany to become a member of the pool unless the Boston & Lowell would also become a member. It is claimed that the Boston & Lowell would not join the pool because the Central Vermont would

not withdraw its Boston ticket office. An agreement was made to advance Western rates to full tariff rates at the same time they are restored in New York, about Dec. 1. It was agreed that tickets purchased after the restoration of rates, at less than tariff rates, are to be redeemed at full rates through the Assistant Commissioner in New York. Owing to the non-agreement of the Boston lines to formulate a plan for the pool, it was recommended that the matter of issuing tickets should be referred to the general managers for adjustment.

Illinois Passenger Rates.

At a meeting of the Illinois Board of Railroad & Warehouse Commissioners, held Nov. 13, it was ordered that the rule governing passenger fares on roads operating in Illinois be amended as follows:

"The passenger rate on each of said roads shall not be to exceed 3 cents per mile for the transportation of any person with ordinary baggage not exceeding 150 pounds in weight. Provided said railroad corporation shall not charge, collect or receive more than one-half the above rate for the transportation of children between the ages of 5 and 12 years; a charge of 10 cents may be added to the fare of any passenger when the same is paid upon the cars, if a ticket might have been procured within a reasonable time before the departure of the train. No road will be required to carry a passenger for less than 5 cents, and the fare shall be 3 cents per mile for any distance of 3 or more miles.

"In computing fares the distance shall be multiplied by the rate, and when the fraction of one cent is one-half or over, it shall be reckoned as one cent, and for a fraction of less than one-half cent the same shall not be computed. To take effect Dec. 1, 1885."

Winter Rates to Buffalo.

In Buffalo, N. Y., Nov. 19, the Merchants' Exchange adopted the following:

"Resolved, That the members of the Merchants' Exchange respectfully ask the general freight agents of the railroads entering here to so arrange the schedule of prices that the rates to be established for east-bound freight on flour, grain, etc., for the winter months shall not discriminate against Buffalo to the detriment of its commerce.

"Resolved, That the chair appoint a committee of three to confer with the general railroad freight agents."

The Trunk Line Agreement.

After considerable negotiations with the Pennsylvania Co., and some hesitation, President Garrett, of the Baltimore & Ohio, has signed the trunk line agreement, but conditionally. The reservation made by him being "That the Baltimore & Ohio will be bound by the provisions of the contract so far as it relates to passenger traffic, only in case it becomes a member of the trunk line passenger division."

This action on the part of Mr. Garrett may have the effect of preventing for the present a settlement of the passenger rate troubles and a full restoration of through passenger fare.

RAILROAD LAW.

Contract to Pay Bonus to a Railroad.

In the case of the Chicago & Atlantic Co. against Derkes and others, the Indiana Supreme Court holds as follows:

Action against the makers of the following bond: "In consideration of the benefits that will accrue to us in the location and construction of the Chicago & Atlantic Railway through the county of Adams, in the state of Indiana, by way of and through the town of Decatur, in said county, we, whose names are hereto attached, hereby acknowledge ourselves bound unto the Chicago & Atlantic Railroad Co. in a sum sufficient to pay for the right of way across Adams County, as mentioned above, this bond to include the right of way exclusive of depot grounds and switches, etc." After this contract was accepted and acted on by the company the makers of it cannot claim that there is a want of mutuality. When the company acted on such contract it became the mutual and binding contract of each and all the contracting parties. The contract is also based on a sufficient consideration. The parties received all the consideration they contracted for, and this was sufficient to make the contract binding. After having executed the bond, and the company having acted on the faith of it, the makers of the bond cannot be heard to claim that it was ultra vires, and this is true whether the corporation had or had not power to execute it."

Railroad Conductors' Liability.

A railroad conductor who permits a passenger to travel on his train taking with him goods known to the conductor to be stolen is not liable to an action therefor by the owner of the goods, according to a recent decision of the Supreme Court of Maine, in the case of *Randlette vs. Judkins*. The Court, in giving judgment, said: "The railroad is a public highway over which all members of the public who are in a proper condition to travel in a public car, who pay the established fare and conduct themselves properly, have a legal right to travel with luggage. It is the legal duty of the conductor to permit all such persons to enter the cars and travel over the road. For sufficient cause he may stop the train and eject a traveler from the train. He owes no legal duty to the public to stop his train and eject a traveler who is guilty of felony, or to arrest such traveler and hold him as a prisoner, and seize the property he may have in his possession. As a citizen, he may have the right, if he sees fit, to arrest a traveler who is guilty of a felony, and hold him until he can be properly prosecuted; but not being an officer charged with the duty, and having no legal warrant therefor, he is under no legal duty to do so, and thereby take upon himself the burden and hazard of justifying his act. Nor does he owe any duty to any member of the public to arrest a thief, and seize and hold the stolen property he may have in his possession, or to seize and hold for the owner, whoever he may be, goods which a traveler on the road may have taken and is carrying away as a trespasser." The Court added: "We have discussed the question involved upon principle, there being no authorities directly in point cited by the learned counsel on either side, and it is said there are none."

OLD AND NEW ROADS.

Americus, Preston & Lumpkin.—Track on this road is now laid to Richland, Ga., 9 miles westward from the late terminus at Preston and 29 miles from the connection with the Central Railroad at Americus. The grading from Richland to Lumpkin, 9 miles, is about completed, with track-laying in progress, and the company hopes to have trains running to Lumpkin about the middle of December.

Atlantic & Great Western.—The survey of this projected narrow-gauge line will be begun about Dec. 1. A line will first be run from Johnston, S. C., to Ninety-six, and the survey will be extended from Ninety-six to Greenville as rapidly as possible. The officers of the line hope to have a section located and under contract by the end of the year.

Baltimore & Ohio.—As is well known, there has been a good deal of speculation for some time past as to how this

company would secure a water front and suitable terminal arrangements on the New York Harbor. The company some time ago made a contract under which it will acquire the use of the Philadelphia & Reading from Philadelphia as far as Bound Brook, but no agreement was made for the use of the New Jersey Central from Bound Brook to Jersey City, and it has been generally reported that the company would build its own line from Bound Brook to the Hudson River. The building of the line was not a difficult matter, but the securing of proper terminal facilities was entirely another question. It is now announced that the Baltimore & Ohio has leased for 99 years the property of the Staten Island Rapid Transit Co., including an extensive water front on the north shore of Staten Island, directly facing New York, and about 5 miles from the Battery. The Staten Island Rapid Transit Co. has a railroad line, which is now all graded and on which tracklaying is now in progress, from Port Richmond on the west side of the island, along the shore to a connection with the old Staten Island road at Vanderbilt Landing, and it also controls the old Staten Island road with its line from Vanderbilt to Tottenville on the south side of the island, and its valuable ferry franchises. The intention as given out is to build a new line from Bound Brook parallel with the Central of New Jersey to Elizabethport, cross the Kill von Kull by a bridge, and connect with the Staten Island road. The new road required will be about 20 miles long, and the most expensive portion of that work will probably be the bridge over the Kill. This will be crossed at its narrowest point, where it is only about 700 ft. wide, but there a high bridge or a very long draw-span will be required to prevent obstruction to navigation, and a high bridge would necessitate the raising of the road to a high level above the surrounding country, the land on the west of the Kill being low and flat for several miles back. The property owned by the Rapid Transit Co. presents abundant facilities for docks on deep water, and the ferry can be practically shortened by the use of fast boats. For freight purposes especially the Staten Island terminus would be a very eligible one.

This new move of the Baltimore & Ohio will doubtless raise considerable opposition; the chief point at which this will be felt will probably be in relation to the building of the bridge. While a company can be chartered under the general law of New Jersey, the permission of the Legislature will be required before the bridge can be built, and it will also require the consent of Congress, as it will cross navigable waters, so that, in any event, it will probably be a year before the new line can be finished, even if the opposition to it does not prove serious.

Boston & Maine.—The directors have issued the following circular to the stockholders in relation to the leases of the line from Portland to Worcester:

"Some six years since the city of Portland, who held the controlling interest in the Portland & Rochester Railroad, sold the same at public auction, and, as it was at that time used in connection with the Nashua & Rochester and the Boston & Lowell railroads to divert traffic legitimately belonging to the Boston & Maine and the Eastern railroads, we in connection with the Eastern Railroad, took measures to purchase that interest, and at the present time we hold in our own right, and through our lease of the Eastern, 4,820 shares out of the 6,000 shares which constitute its capital stock. This investment has proved very satisfactory, both as a protection to our own traffic, and as yielding a fair interest on the amount invested. The Worcester, Nashua & Rochester Railroad is a line from Worcester to Rochester, N. H., 94½ miles long, passing through Nashua and many important manufacturing towns, paralleling our road for a considerable portion of its length, and by itself or through alliance with other roads, being in a position at any time to inaugurate a war of rates, which must result disadvantageously both to this road and to the public interests involved.

"The Worcester, Nashua & Rochester, with the Portland & Rochester, will form a line from Portland to Worcester, a distance of 147 miles, in good condition, being almost entirely laid with steel rails, and well equipped with 32 locomotives, 31 passenger cars, 14 baggage, mail and express cars, and 628 freight cars, and with an amount of business upon its line which will give us, if operated at the same percentage as we operate our own line, a sum which will fully meet the rental to be paid. Your directors, taking into consideration that we are at present time owners of nearly five-sixths of the Portland & Rochester, or about one-third of the combined line, and that the two roads can be operated much more economically together than as two distinct corporations, have deemed it to be for the interest of your corporation to lease these roads. Under these leases you assume no liabilities of the leased roads, and no obligations beyond the sum agreed upon as rental, which sum we confidently believe the roads will earn."

Central of New Jersey.—The taking of testimony before the Master in the suit to set aside the lease of the road has been resumed in Philadelphia. The evidence put in this week has been chiefly in relation to the condition of the road, the Reading Co. seeking to show that it has not deteriorated under its management.

Chautauqua Lake.—A large force is now employed on the grading of this road and rapid progress is being made. The work will be pushed as fast as possible, with the view of having the road for summer travel next season.

Chicago & Atlantic.—It is reported that there is a movement among the bondholders to foreclose the first mortgage on this road, and that as soon as a sufficient number of signatures are secured proceedings will be begun. The interest has been in default since November, 1884.

Chicago, Burlington & Quincy.—The St. Joseph (Mo.) Herald says: "A reporter of the Herald was informed yesterday that the Burlington & Missouri River Co. is now placing a contract for building a permanent bridge across the Missouri River from Rulo, Neb., to Boswell, on the Missouri side of the Big Muddy. The construction of the bridge is to be commenced this winter, and will be completed early in the spring of 1886. The plan upon which the piers are to be sunk can be carried out much better in winter than in summer. When the bridge is completed it is expected that the Chicago, Burlington & Quincy Co. will run its through trains from Denver over the four miles of track from Boswell to Napier, known as the St. Joseph & Nebraska Railroad, and from that point over the Kansas City, St. Joseph & Council Bluffs Railroad through St. Joseph to Kansas City and vice versa, with the trains from Kansas City to Denver instead of running on the Kansas side of the river, as the trains are being run at present.

"This change will be a most important one both for the Burlington & Missouri River Railroad and for the people living along its lines in Kansas and Nebraska, as it will provide an ingress as well as an egress for those people who have for a long time desired to have direct connection with St. Joseph. The west-bound freight has been transferred on a ferry-boat heretofore at Rulo, but that has become to be very unsatisfactory on account of the rapidly increasing business."

Chicago, Milwaukee & St. Paul.—It is stated, apparently by authority, that the directors of this company have resolved to commence work at once on the extension of

the road from Ottumwa, Ia., to Kansas City. It is reported that a contract has already been let for 10,000 tons of steel rails for use on this extension.

Chicago & Northwestern.—On the new branch from Centerville, Dak., to Yankton the grading is now nearly completed and tracklaying is now in progress. At latest report the rails were down for 15 miles from Centerville. The extension will be completed by the close of the year, if the weather permits.

Chicago, St. Meinrad & Ohio River.—This company has filed articles of incorporation in Indiana to build a railroad from Jasper, in Dubois County, to Tell City, a distance of 35 miles. It is intended to be a coal road, and in connection with the other projected lines to form a through line, by which coal can be carried either to the Ohio River or northward to Chicago.

Cincinnati, Indianapolis, St. Louis & Chicago.—This company's statement for September is as follows:

| | 1885. | 1884. | Decrease. | P. c. |
|-------------------------|-----------|-----------|-----------|-------|
| Earnings..... | \$219,256 | \$250,987 | \$31,731 | 12.7 |
| Expenses..... | 130,771 | 149,201 | 18,430 | 12.4 |
| Net earnings..... | \$88,485 | \$101,786 | \$13,301 | 13.0 |
| Fixed charges..... | 50,000 | 50,000 | ..... | ..... |
| Surplus..... | \$38,485 | \$51,786 | \$13,301 | 25.6 |
| Surplus to Aug. 31..... | 56,514 | 70,158 | 13,644 | 19.5 |
| Total, 3 months..... | 94,999 | \$121,944 | \$26,945 | 22.1 |

The company's fiscal year begins July 1, and the total surplus over fixed charges is for the three months from that date to Sept. 30.

Cleveland & Canton.—The Secretary of this company (successor to the Connotton Valley) has sent to stockholders a circular stating that counsel advise that the certificates of stock are not legal or valid and asking to have them returned to be stamped or reissued. The illegality consists in their having been issued before a deed of the property and franchise was obtained from the reorganization trustees.

Gulf, Colorado & Santa Fe.—This company has succeeded in placing \$600,000 of its new second-mortgage bonds in England. The new issue is limited to \$12,000 per mile of road, and the proceeds are to be used for the extension and new construction now in progress.

Houston, East & West Texas.—The Receiver has completed the work of tracklaying to the Sabine River at Logansport, Tex., 192 miles from Houston. The Louisiana end of the line was finished to the river a short time ago, and since the bridge over the Sabine is finished, there will be continuous track from Houston to Shreveport.

Illinois Central.—The directors have resolved to issue \$1,500,000 additional first mortgage bonds. These bonds will be secured under the mortgage of 1874, which was for \$15,000,000. The new bonds will be dated Jan. 1, 1886 and will have 65 years to run, at 4 per cent. interest. They will shortly be offered for subscription.

International.—An Ottawa dispatch says that the Dominion government has agreed to give this company the subsidy voted for the European Short Line from Montreal to Halifax and St. John. The International already has a road from Lennoxville, Que., to Lake Megantic, 67 miles, and work has been done on the extension of the road which is to run through Maine. It is not proposed to build an entirely new line, but portions of existing lines will be used wherever possible.

Iowa Railroads.—Advance sheets of the Iowa Railroad Commissioners' report show that the total number of miles of railroad in operation is 7,478. Taking such proportion of the stock of roads running through the state as will represent the mileage in Iowa, and adding it to the stock of the roads entirely in Iowa, the Commissioners estimate the entire amount on broad gauge roads at \$133,484,621, or \$18,604 per mile; narrow gauge roads, \$1,267,575, or \$7,826 per mile. The total amount of stockholders living in the state is 549. The total amount of stock owned by persons living in the state is \$7,950,650. The increased mileage reported is 1,280; increased indebtedness, \$16,349,856, or \$12,771 per mile; total earnings for the year ending June 30, 1885, \$36,123,587; total earnings for the year ending June 30, 1884, \$35,735,271; increase over previous year, 1.07 per cent.; \$388,315; total amount of taxes paid by the railroads in the state, \$768,274, or \$112,874 less than last year.

Some of the roads have availed themselves of the provisions of the present law, and paid only one-half their taxes before they reported to the Commissioners. It is thought that the revenue received from the railroads during the year 1885 will be larger than ever before. Commissioner Coffin renews his recommendation that Sunday trains be dispensed with. The larger part of the report is devoted to a full discussion of the freight problem, as to whether the carload or the hundredweight shall be the unit, which has been so much discussed by Western jobbers for months past, resulting in the recent compromise at Chicago. The Commissioners adhere to the carload as the unit. The Legislature is urged to require the roads to fence with barbed wire. The railway employees of the State number 25,666, their earnings being \$13,688,168. During the year 156 persons were killed on the roads in the State. Of these 9 were passengers, 72 employees, and 75 persons not connected with the operating of the road. Fourteen were killed by derailment, 15 by collision, 2 caught in frogs, 13 coupling cars, 16 falling from trains, 9 getting on and off trains while in motion, 8 at highway crossings, 25 from miscellaneous causes, 7 from stealing rides, 3 while intoxicated, 40 trespassing on tracks, and 4 suicides.

Jacksonville, Tampa & Key West.—Track is now laid for 8 miles southward from the late terminus at Seville, Fla., and 37 miles southward from Palatka. The work is progressing steadily, and the company hopes to have trains running to Sanford by the middle of December.

Lake Shore & Michigan Southern.—This company's statement to the New York Commission for the quarter ending Sept. 30 is as follows:

| | 1885. | 1884. | Decrease. | P. c. |
|---|-------------|-------------|-----------|-------|
| Earnings..... | \$3,677,361 | \$3,741,269 | \$63,908 | 1.7 |
| Expenses..... | 2,208,125 | 2,221,610 | 13,485 | 0.6 |
| Net earnings..... | \$1,469,236 | \$1,519,353 | \$50,117 | 3.3 |
| Interest, taxes and rentals | 1,088,028 | 1,099,008 | 12,080 | 1.2 |
| Surplus..... | \$381,208 | \$420,345 | \$39,137 | 8.8 |
| The surplus for the quarter this year is equivalent to 0.77 per cent. on the stock. | | | | |

Little Rock, Mississippi River & Texas.—In the United States Circuit Court at Little Rock, Ark., last week, suit was begun to foreclose the mortgages on this road. The Court was asked to appoint a receiver in the interest of the bondholders, and will hear arguments on the motion.

Merrill & Abbottsford.—This company has filed articles of incorporation to build a railroad from Abbottsford on the Wisconsin Central road to Merrill, a distance of 38 miles. It will be a lumber line chiefly.

Mexican Central.—The exhibit of earnings for September and for nine months is as follows:

| | September. | 1884. | 1885. | 1884. |
|-------------------------|------------|-----------|-------------|-------------|
| Gross earnings..... | \$238,794 | \$246,000 | \$2,650,414 | \$2,101,248 |
| Operating expenses..... | 153,031 | 108,131 | 1,526,531 | 1,020,729 |
| Net earnings..... | \$85,763 | \$37,875 | \$1,123,883 | \$174,518 |

The increase in net is very large, an increase in gross earnings having been aided by a large reduction in expenses.

Mexican National.—Following is a statement of the earnings for September, and from Jan. 1 to Sept. 30:

| | September. | 1884. | 1885. | 1884. |
|-------------------------|------------|-----------|-----------|-------------|
| Gross earnings..... | \$100,030 | \$100,352 | \$999,071 | \$1,026,059 |
| Operating expenses..... | 86,808 | 97,812 | 818,777 | 930,356 |
| Net earnings..... | \$13,122 | \$2,540 | \$180,294 | \$95,703 |

These earnings are given in Mexican currency; they show a considerable net gain.

Mexican Railroad Notes.—The following notes are from the Mexican Financier of Oct. 31:

A small amount of new work has been ordered on the Tampico branch of the Central road.

Sixteen miles of the San Blas Division of the Central are built, but trains have ceased running thereon.

Attempts at train wrecking have been discovered and frustrated recently on the Yucatan Railway from Mérida to Calcutin.

It is reported that the Sonora Railway Co. intends to remove its headquarters and shops from Guaymas and Benson to Nogales, on the Mexican side of the border. Guaymas has turned out to be a very unhealthy town. The Nogales people are naturally anxious for the change to be made. The altitude of Nogales prevents the possibility of the yellow fever reaching the town.

Mr. Huntington, who controls the International Railway, denies that there is any likelihood of the road being sold to English parties, and says that when business improves it is proposed to extend the line down to Villa Lerdo in the Laguna country. This would give the Central direct connection with the Sabinas coal fields. It is stated that the International road is already built two years ahead of the demands of the concession.

The search of the Central people for coal at Jimulco has not been rewarded as yet. The bores are down 600 ft., but no coal has been brought up.

Thirty-six kilometers of the National road between Morelia and Lagunilla have been completed. Connection between trains running on this section and Patzcuaro is made by stages.

Milton & North Mountain.—This company has been organized to build a railroad from Milton in Northumberland County, Pa., to Millville in Columbia County, a distance of about 25 miles. The road will run through a very good farming country and will also reach a large timber tract.

Missouri, Iowa & Nebraska.—Since this road was separated from the Wabash system the Receiver has been making extensive improvements in the property, which was in very poor condition when it came into his hands. The roadbed has been as much improved as the time has permitted and 8 miles of steel rails have been laid where they were most needed. New passenger coaches have been purchased for the road and a large number of freight cars are now under construction. Other improvements will be made as rapidly as time and the money at command will permit.

Missouri Pacific.—This company announces the completion and opening for business of the Rooks County Branch, which connects at Alton, Kan., 232 miles west of Atchison, with the Central Branch Division, and extends from that point to Stockton, a distance of 18 miles. Stockton, the terminus of the road, is the centre of a section of country which is filling up very rapidly with immigrants.

Nashville, Chattanooga & St. Louis.—This company makes the following statement for October and the four months of the fiscal year from July 1 to Oct. 31:

| | October. | 1884. | 1885. | 1884. |
|-------------------------|-----------|-----------|-----------|-----------|
| Earnings..... | \$191,846 | \$203,737 | \$732,494 | \$819,987 |
| Expenses..... | 115,781 | 123,374 | 433,441 | 462,464 |
| Net earnings..... | \$76,065 | \$80,363 | \$299,053 | \$357,523 |
| Interest and taxes..... | ..... | ..... | 225,162 | 228,816 |
| Surplus..... | ..... | ..... | \$73,891 | \$128,707 |

For the four months there was a decrease of \$87,493, or 10.7 per cent., in gross earnings; of \$58,470, or 16.3 per cent., in net earnings; and of \$54,816, or 41.7 per cent., in the surplus over fixed charges.

New England & Southwestern.—This company, which was recently organized to build what is known as the Storm King Bridge, over the Hudson River, with a connecting line on each side of the river, has filed for record a mortgage for \$6,000,000 on the projected line. The mortgage covers a route from Brewster, N. Y., to the connection with the Newburg branch of the Erie, a distance of 26 miles.

New York City & Northern.—The Receiver makes the following statement for October and the nine months from Feb. 1 to Oct. 31:

| | October. | 1884. | 1885. | 1884. |
|---------------|----------|----------|-----------|-----------|
| Earnings..... | \$44,397 | \$34,020 | \$340,663 | \$272,617 |
| Expenses..... | 31,083 | 32,904 | 275,295 | 275,352 |

Net or deficit, N. \$13,314 N. \$1,116 N. \$65,368 D. \$2,735 For the nine months the gross earnings increased \$68,046, or 24.9 per cent., while the expenses decreased \$57, the result being a net gain of \$68,103, replacing last year's deficit with net earnings, as shown above.

New York, Lake Erie & Western.—The following notice, issued by Drexel, Morgan & Co., of New York, explains itself:

"The New York, Lake Erie & Western Railroad Co. has made contracts with us which provide for the funding of the entire floating indebtedness of the company (as shown by the President's statement), in order that the net receipts of all kinds may, in future, be appropriated to the payment of the interest on all the funded debt of the company.

"The floating debt will be provided for by the issue of bonds of the Long Dock Co. (the New York terminus of the New York, Lake Erie & Western Railroad Co.), which bonds have been negotiated, and will enable the Dock Co. to reimburse the railroad company for the large amount due the latter by the former.

"This negotiation, however, is upon the condition that the holders of the second consolidated mortgage bonds and of the second consolidated mortgage funded coupon bonds of the New York, Lake Erie & Western Railroad Co. shall receive payment in cash of the coupon which matures Dec. 1, 1885, and shall fund those of June and December 1884, June 1885, and June 1886 into a gold bond maturing in 1909, bearing 5 per cent. interest, and secured by a deposit with the Farmers' Loan & Trust Co. of the coupons thus funded, which will preserve all their original lien.

"These bonds can be paid off at 105, at the pleasure of the company, and upon such payment a corresponding amount

of the original coupons will be canceled. The first coupon upon the funded bonds will mature Dec. 1, 1885.

"In pursuance of the foregoing contracts, we are prepared to pay the coupon due Dec. 1, 1885, in cash, upon surrender to us of the coupons designated for funding, for which we will issue our temporary receipts exchangeable into definite bonds, as soon as the same can be engraved and executed."

New York & New England.—The Governor and Council of Massachusetts have decided to sell the \$1,842,000 second mortgage bonds owned by the Commonwealth to Francis L. Higginson and associates, who bid 90 for the bonds, and further agreed to subscribe for 28 per cent. of their face value in the new preferred stock. Mr. Higginson, it is understood, is friendly to the present management of the company, and desires their continuance in office. Several bids were received for these bonds, among them one of Russell Sage and associates, who offered 95½.

Reports continue to be circulated of negotiations for a lease of this road to the New York, New Haven & Hartford Co., but nothing definite can be ascertained in regard to them.

Messrs. Sage and Field, whose bid of 95½ flat for the bonds was rejected, entered a formal protest. They also brought the matter before the directors, but the board declined to discuss it at all. The general impression in Boston seems to be that their object is to obtain a majority of the second-mortgage bonds and then to press for a foreclosure.

A meeting of the board was held in Boston, Nov. 24, at which it was voted to authorize the President and Treasurer to take such action as may be necessary to have the Receiver discharged and the road restored to the company.

The Treasurer is now paying off all overdue coupons, and is settling the floating debt as fast as the subscriptions to the new preferred stock come in.

New York, New Haven & Hartford.—It is understood that the freight business in New York will soon be entirely removed from the old station in Centre street, which has been used for many years, to Pier 50 East River.

There is still a good deal of talk about a proposed lease of the New York & New England road by this company, and there is little doubt that some negotiations to that effect have been in progress, and that some, at least, of the New Haven directors have favored the lease. It is stated, however, that the Boston & Albany Co. has intimated to the New Haven Co. that, in case such a lease should be made, it would at once take steps to secure a line of its own from Springfield to New York, and it is stated that this threat will probably prevent the completion of the lease. Most of these rumors, however, are rumors only, as the directors of both companies have been exceedingly careful in making definite statements with regard to them.

New York, Ontario & Western.—In the spring of 1882 this company abandoned the branch from Norwich, N. Y., to DeRuyter, which had always been unprofitable, taking up the rails and allowing the bridges and other structures to decay. The towns along the line of the abandoned road originally bonded for its construction, and while they are now from year to year paying off their bonds they are deprived of the benefits and convenience of the road. In the fall of 1883 several meetings were held of parties representing the several towns, which resulted in the employment of counsel and the commencement of legal proceedings by the People on the relation of William B. Monroe, of Plymouth, to compel the railroad company to reopen and operate the line of road from Norwich to DeRuyter. The matter came on first to be heard at the special term held in Chenango County in March, 1884, Judge Murray presiding. The case was adjourned, to be held at a special term in Delhi, and after elaborate argument the Court decided that the road must be opened. From this decision the company appealed, and the case was argued before the General Term on appeal in January last. The Court has now rendered its judgment affirming the order of the Court below, and holding that the company must reopen and operate the part of its line which it had abandoned. This involves, on the part of the company, a necessity of rebuilding and putting in proper construction about 28 miles of road running from Norwich through the towns of Norwich, Plymouth, Smyrna, Otsego and DeRuyter. The case is of such importance that the company will probably carry it up to the Court of Appeals.

New York, Susquehanna & Western.—This company's statement for October is as follows:

| | 1885. | 1884. | Increase. | P. c. |
|--------------------|-----------|----------|-----------|-------|
| Earnings | \$105,086 | \$99,058 | \$6,028 | 6.1 |
| Expenses | 55,349 | 54,180 | 1,169 | 2.2 |
| Net earnings | \$49,737 | \$44,878 | \$4,859 | 10.8 |

The proportionate amount of interest charges was \$34,250 in October of this year, leaving a surplus of \$15,487 for the month.

New York, West Shore & Buffalo.—In Syracuse, N. Y., Nov. 21, the Supreme Court granted a preliminary injunction to restrain the New York Central from leasing this road, or from guaranteeing the new bonds. The injunction was granted on motion of Mr. Marshall, who voted some 300 shares of Central stock against the agreement with the West Shore when it was ratified by the Central stockholders, who at that time entered a formal protest. The injunction is the usual preliminary order, and is accompanied by an order to show cause why it should not be continued, which was made returnable Nov. 28. The ground for the application is that the new agreement would be injurious to the interests of the Central stockholders and that the law forbids the consolidation of parallel and competing lines.

Norfolk & Western.—It is announced that this company has secured the money necessary to complete 23 miles of the Cripple Creek Extension. This extension is from New River, Va., to the coal and iron mines south of the main line. A private cable dispatch from London says that President Kimball placed \$600,000 of the improvement and extension bonds at a price near par.

Northern Pacific.—Surveys are now in progress for several new branches, upon which work will be begun in the spring. Among these branches are an extension of the Fargo Southwestern Branch, from Lamoure, Dak., southwest 20 miles; the Butte Branch, from Garrison, Mont., to Butte, and a branch from Spokane Falls to Farmington in Washington Territory, and other branches to the Big Bend settlement and the Colville country in Washington are also spoken of. A company to build the Farmington Branch has already been organized under the name of the Eastern Washington Railroad Co., the incorporators and directors being all officers of the Northern Pacific.

It has been reported that the continuation of work on the Cascade Division has been ordered, but no definite action has as yet been taken by the board, and no contract for the summit tunnel, upon the completion of which the completion of the division will necessarily depend, has been let.

Oakland & Colby.—This company has been organized to build a railroad from Oakland in St. John County, Kan., to Colby in Thomas County, a distance of 35 miles.

Ohio & Mississippi.—This company has made a proposition to remove its shops from Seymour and Vincennes to

Washington, Ind., making that place the division station and the mechanical headquarters of the road, provided the town will donate 60 acres of land and \$75,000 in money. The proposition is now under discussion.

Pennsylvania.—The track on the Schuylkill Division is now laid to Hamburg, Pa., 17 miles northwest from Reading and 75 miles from Philadelphia. The work of ballasting the track is in progress, and as soon as it is completed the passenger trains, which heretofore have not been run beyond Reading, will run through to the new terminus. Between Hamburg and Port Clinton there is some heavy rock cutting in progress, which will take some time to complete, and for a short time the track laying will probably not advance very rapidly.

Philadelphia & Reading.—The Philadelphia Press says of the plan of reorganization now under discussion by the trustees and the bondholders' committee: "It seems not generally understood that the plan which will be discussed to-day, or any plan which may in the future be formulated, is based on foreclosure. Whatever plan may be agreed upon has no connection with the present company as a company or the present management as a management. It simply is an agreement between the signers to it that they will buy the property in at the foreclosure sale for an amount not exceeding so much, and then divide the purchase in the manner and proportions named in the plan. It does not prevent any other party or faction from bidding at the sale, and, if offering a larger amount, taking the property. Of course this agreement contemplates the formation of a new company, and the continuance of the railroad under a new management."

The question in regard to the annual meeting has been opened up by General Collis, the chairman of the committee appointed at the last annual meeting to investigate the condition of the company. General Collis states that in the original charter granted in 1833 it was provided that the shareholders' votes should be cast as follows: For every share not exceeding 2 shares held by one person, 1 vote; for every 2 shares above 2, and not exceeding 10, 1 vote; and for every 5 shares above 10, 1 vote. While this provision was in force the holder of 100 shares, for instance, would be entitled to 23 votes only. In 1845 an amendment to the charter was passed providing that each share of stock should have 1 vote, without reference to the number held, but this same act also provided that all holders of bonds or certificates issued by the company should have votes, each \$200 of debt being considered equal to 1 share of stock. These provisions were not to go into effect unless they were accepted, on a general meeting of the stockholders. It does not appear that they were ever so accepted, and bondholders have never voted at the annual meetings, but ever since that time the stockholders have voted in the ordinary way—that is, casting 1 vote for each share of stock. General Collis now claims that if the amendment of 1845 was accepted by the company the bondholders are entitled to vote, and have been illegally deprived of their rights; but, if the amendment was not accepted, then there is no legal authority for voting the stock as has been the custom, but the graduated scale provided for in the original charter is still in force. He also claims that the according of 1 vote to each share at all elections since 1845 is a virtual ratification and adoption by the stockholders of the amendment, although there may have been no formal acceptance; and in such case the bondholders clearly have a right to vote, as it was not possible to accept the amendment in part and to leave the rest. It is understood that the officers of the company claim that the amendment was never accepted, and that consequently the claim of the bondholders to vote cannot be allowed.

If General Collis' view should be correct, and if the legal method of voting is still that provided in the original charter, it is manifest that a disproportionate weight will be given to the small holders of the stock, which may make a very decided and important change in the result. It does not appear probable, however, that any change will be made before the coming annual meeting; but it is very probable that there will be some litigation over the result.

Pine Bluff & Swan Lake.—The running of trains on this short Arkansas road is suspended for the present on account of a dispute with the Receiver of the Texas & St. Louis road, whose tracks the trains of the Swan Lake road have heretofore used for some 7 miles, to reach the Arkansas River at Rob Roy. It is thought, however, that the dispute will be shortly arranged and the operation of the road resumed.

St. Cloud, Mankato & Austin.—Revival of this project is chiefly due to a law passed by the last Legislature of Minnesota renewing the land grant for the road. Work, it is understood, will shortly be begun on a section of the road from St. Cloud, Minn., to Richmond, 20 miles, and the intention is to extend it next year from Richmond to Willmar. It is understood that the company is now controlled by the St. Paul, Minneapolis & Manitoba.

St. Louis, Carbondale, Metropolis & Paducah.—Amendment articles of incorporation of this company have been filed providing for the construction of a road from East St. Louis to Metropolis, Ill., and thence to a point on the Ohio River opposite Paducah, Ky. The capital stock is fixed at \$2,000,000, and the principal office will be in East St. Louis.

Shreveport & Houston.—From present appearances this road, which is the Louisiana end of the Houston, East & West Texas, will remain for some time in charge of a receiver, the bondholders being apparently either unable to agree among themselves or to raise the money required to pay off the floating debt.

In Shreveport last week two intervening petitions were filed in the suit; one on behalf of the Bremond estate, claiming a large interest in the stock, and the other on behalf of the Houston, East & West Texas Railroad Co., claiming to be a creditor of the Shreveport & Houston Co. to the amount of \$100,000, money advanced to build the road. Both these parties are opposed to the plan of the bondholders, and both desire to have the Receiver retained in possession.

South Carolina Railroads.—The report of the South Carolina Railroad Commission for the year ending June 30 last, says that although the depression in business has been so great during the past year, 8 railroads have reported an increase in earnings over 1884, and 10 show a slight decrease. At the same time, more miles of new road have been constructed during the last year than in any other year for a decade, 103½ miles of new road having been built in that state, and 10 miles on the Spartanburg & Asheville, which, although in North Carolina, is of the greatest importance to South Carolina.

Capital stock of the railroads as far as reported

Funded debt as far as reported

Unfunded debt

Total debt

The Charleston & Savannah; Cheraw & Chester; Chester & Lenoir; Greenwood, Laurens & Spartanburg, and the Spartanburg, Union & Columbia railroads, made no reports under the above heads.

The income of the railroads is as follows:

| | |
|--|-------------|
| Earnings of passenger department | \$2,168,232 |
| Earnings of freight department | 3,885,135 |
| Income from other sources | 1,212,99 |

Total income

Total expenses

Net income for the year ending June 30, 1885

Net income for the year ending June 30, 1884

Increase of net earnings of 1885 over 1884

This increase includes the net earnings of the Cape Fear & Yadkin Valley; but does not contain any report of the earnings of the Greenwood, Laurens & Spartanburg Road. Deducting the net earnings of the Cape Fear & Yadkin Valley road (\$37,878), there is still an increase of net earnings in 1885 over 1884 of \$288,154. The increase is mainly due to a decrease in expenses, which in 1884-85 were \$258,130 less than in 1883-84, without including the expenses of the Cape Fear & Yadkin Valley road.

Texas & St. Louis.—The Receiver continues to improve the condition of this road as fast as it is possible with the means at his command. About 6,000 tons of steel rails were recently purchased, and are now being laid on the Texas Division. The new rails are heavy enough for standard gauge rolling stock, and the bridges on the road are being made wide enough for standard gauge track as they are replaced or repaired. Every preparation that is at present possible is being made, so that when the new company shall take possession all that will remain to be done to change the road from 3-ft. to standard gauge will be merely the shifting of the rails.

Texas Trunk.—This unfortunate road was again sold at public sale in Dallas, Tex., Nov. 19, being the fifth or sixth time it has been so sold. It was purchased by Mr. W. W. Weigley, of Philadelphia, for \$250,000. The company has been reorganized and, it is stated by its representatives, that it will at once begin to work on the extension of the road from its present terminus to Athens. It is also stated by those representatives that the new company is not in any way connected with or controlled by the Missouri Pacific or Gould interest. The road is now completed and in operation from Dallas to Kemp, 49 miles. The intention is to complete it ultimately to Sabine Pass.

Topeka, Frankfort & Marysville.—This company has been organized to build a railroad from Topeka, Kan., to Marysville in Marshall County, a distance of 80 miles.

Waterloo & Seneca Falls.—This road has recently been completed from Seneca Falls, in Seneca County, N. Y., westward to Waterloo, a distance of 5 miles. It is a light road, designed chiefly for passenger traffic, and is operated by steam cars, the engine being carried in the forward part of the car.

Wheeling & Lake Erie.—Track was recently completed on the extension of this road to Bowerstown, O., 7 miles southward of the late terminus at Sherrodsville and 17 miles from Valley Junction. At Bowerstown connection is made with the Pittsburgh, Cincinnati & St. Louis road. There still remains a gap of 39 miles to complete the road to Wheeling.

Wisconsin Central.—The Commercial and Financial Chronicle says: "The General Term of the Supreme Court of Wisconsin has just handed down a decision affirming a former finding of the referee in December, 1883, in the suit brought against the Wisconsin Central Railroad Co. by holders of old first mortgage land-grant bonds of 1871. The Wisconsin Central Railroad Co. was reorganized without a foreclosure, and under the decision just given the lien of the old unsatisfied first mortgage bonds is upheld as prior to that of the securities issued under the reorganization; and, secondly, it restrains the trustees from making any payments on the preferred bonds of the reorganized company in preference to any payments which should be made on the old first-mortgage issue."

The latest report in relation to this road is that the company is negotiating for the purchase of the Chicago & Evans-ton road, as an entrance into Chicago. The Chicago & Evans-ton is a short line, completed not long ago, which is supposed to be owned by the Chicago, Milwaukee & St. Paul, or at least by persons largely interested in that company, and it does not appear very likely that they would be willing to sell to a rival line.

ANNUAL REPORTS.

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New York, Lake Erie & Western.

The report of the President, Mr. John King, the only portion of the annual report of this company as yet published, presents the operations of the company in such a condensed, yet clear form, that we give it substantially in full below. It covers the fiscal year ending Sept. 30 last.

During the year there was substantially no change in the mileage, which was reported in 1884 at 1,662 miles, of which 1,074½ are included in the New York, Lake Erie & Western proper, and 587½ in the New York, Pennsylvania & Ohio.

The statement of earnings includes only 68 per cent. of the gross earnings of the last-named road; but all its working expenses are given in the expenses.

The capital stock issued up to Sept. 30, 1885, was as follows:

| | Preferred. | Common. | Total. |
|------------------------|-------------|--------------|--------------|
| Issued to stockholders | \$8,145,800 | \$77,223,100 | \$85,368,900 |
| Held for exchange | 10,900 | 399,700 | 371,600 |
| Held subject to sale | 380,200 | 416,200 | 796,400 |
| Total | \$8,526,900 | \$78,039,000 | \$86,565,900 |

There was no change in the bonded debt during the year, and it therefore stands at \$75,268,485, as in the last report. No interest was paid during the year on the \$25,000,000 second consols or on the \$8,597,400 second consol funded coupons.

The report of the President continues as follows:

EARNINGS.

"The gross earnings and working expenses of the road, including all branches and leased lines, have been as follows:

| | |
|---------------------------|--------------|
| General freight | \$9,043,717 |
| Coal | 4,709,532 |
| Passengers | 3,986,793 |
| Mail | 295,723 |
| Express | 480,723 |
| Miscellaneous | 399,197 |
| Car-service—freight | 29,277 |
| Expenses: | 18,934,573 |
| Conducting transportation | \$5,964,475 |
| Motive power | 4,158,187 |
| Maintenance of cars | 1,305,864 |
| Maintenance of way | 2,363,045 |
| General expenses | 549,916 |
| Total | \$14,347,517 |

| | |
|--|-------------|
| Net earnings | \$4,587,056 |
| To which add earnings from other sources | 1,002,692 |
| Total | \$5,589,748 |
| Interest, rentals, etc. | 4,950,848 |
| Balance | \$638,900 |
| Interest on second consolidated bonds (not included above) | \$2,015,844 |
| Deficit | \$1,376,944 |

"The earnings and expenses of the company (including the operations of the New York, Pennsylvania & Ohio road) for the year, as compared with those of 1884, show a decrease in gross earnings of \$2,702,862, a decrease in working expenses of \$2,010,561, and a decrease in net earnings of \$692,301.

"The working expenses have been 69.79 per cent. of the earnings (including for this purpose the entire gross earnings of the New York, Pennsylvania & Ohio road), an increase over the previous year of 0.27 per cent.

"The earnings and expenses for the year, for the New York, Lake Erie & Western Railroad, proper (excluding those of the New York, Pennsylvania & Ohio) as compared with those for 1884, show a decrease in gross earnings of \$2,128,520; a decrease in working expenses of \$1,405,758, and a decrease in net earnings of \$722,762.

"The working expenses are the lowest in any year since 1867, except in 1878, when they were some \$27,000 less; but the volume of freight traffic in the present year was 38 per cent., and the passenger 24 per cent. more than in 1878.

"The gross earnings of the New York, Pennsylvania & Ohio Railroad accruing to your company under the lease (viz., 68 per cent.) for the year were \$3,444,116, and its entire working expenses were \$3,683,937, resulting in a loss in its operation of \$239,821, as against \$270,281 for the previous year.

"The result of operating this road from the commencement of the lease (May 1, 1883) to Sept. 30, 1885, was as follows:

| | |
|--|-----------|
| Profit for five months to Sept. 30, 1883 | \$199,540 |
| Loss for the year 1884 | \$270,281 |
| 1885 | 239,821 |
| Total | 510,102 |

Net loss to Sept. 30, 1885 \$310,562

"With the restoration of rates to a remunerative basis, the operations of this road should result in a profit to your company.

A comparative statement for the two years is as follows, including 68 per cent. of the gross earnings and all the working expenses of the New York, Pennsylvania & Ohio:

| | 1884-85. | 1883-84. | Inc. or Dec. | P. c. |
|--------------------|--------------|--------------|----------------|-------|
| Earnings | \$18,934,573 | \$21,637,435 | D. \$2,702,862 | 12.4 |
| Expenses | 14,347,517 | 16,358,077 | D. 2,010,560 | 12.3 |
| Net earnings | \$4,587,056 | \$5,279,358 | D. \$692,302 | 13.0 |
| Other income | 1,002,692 | 1,077,625 | D. 74,933 | 7.0 |
| Total | \$5,589,748 | \$6,356,983 | D. \$767,235 | 12.1 |
| Interest, etc. | 4,950,848 | 5,080,762 | D. 129,914 | 1.7 |
| Balance | \$638,900 | \$1,317,221 | D. \$678,321 | 51.5 |
| Int. on 2d consols | 2,015,844 | 2,015,844 | | |
| Deficit | \$1,376,944 | \$698,623 | I. \$678,321 | 97.0 |

In this statement the interest on the second consols is not included in the interest and rentals, but is given separately below.

TRAFFIC.

"There was carried during the year (on the Erie proper), of merchandise freight, 4,116,247 tons, being 580,372 tons and 136,496,329 ton-miles less than the amount transported

during the previous year. The earnings per ton per mile on this traffic were 0.704 cent.; a decrease from the preceding year of 0.042 cent.

"The merchandise freight transported on the New York, Pennsylvania & Ohio road during the year was 3,010,274 tons, being 640,375 tons and 39,469,524 ton-miles less than the amount transported in 1884. The earnings per ton per mile on this traffic were 0.479 cent, being a decrease from 1884 of 0.088 cent.

"Of coal tonnage there was carried during the year on the Erie 6,137,242 tons, being 238,077 tons less than the preceding year, but an increase in ton-miles of 29,096,498. The earnings per ton per mile on this traffic were 0.589 cent, being a decrease from the previous year of 0.085 cent.

"During the year there was transported on the leased road 1,696,207 tons of coal, being an increase of 199,196 tons and 29,759,306 ton-miles over the year 1884. The earnings per ton per mile on this traffic were 0.62 cent, being a decrease from the preceding year of 0.143 cent.

"The gross earnings from passenger traffic (on the Erie proper) were \$3,106,708, being a decrease of \$592,183, as compared with the previous year, or 16.01 per cent.; but the number of passengers carried in 1885 was 5,899,757, as against 5,385,669 in 1884, or an increase of 9.55 per cent.

"The decrease in earnings was due to the decreased rates brought about by the fierce competition for business and the demoralization of emigrant rates. Owing to the action of the Pennsylvania Railroad Co. on Jan. 18, 1885, in reducing the rates on emigrants to the basis of \$1 from New York to Chicago, causing this company to withdraw from that traffic, the revenue has been reduced from \$177,841 in 1884 to \$35,540 in 1885, and the number of emigrants carried from 35,878 in 1884 to 8,901 in the present year; or a decrease of \$142,301 in revenue and 26,977 in number. Comparing 1885 with 1883, the reduction in revenue from this source is \$332,871 and in the number of emigrants carried 52,665.

"The passenger equipment has been taxed to its fullest extent during the past season; and while, for the causes given, this traffic has not been as remunerative as in former years, yet it is gratifying to record the increased volume of business.

"Special attention has been given to the development of the suburban traffic, additional trains having been put on, and the time of the former ones greatly quickened, all of which has borne good results in the formation of building associations at several points along the line to promote settlements in the localities benefited by the improved facilities thus extended.

CAR TRUSTS.

"Under the original agreements governing the Car Trusts there was due and payable, during the present fiscal year, on account of principal and interest, the sum of \$1,201,200.

"The company, however, proposed to the holders of the various car trust securities that, instead of making the payments of principal as provided, it would make none on that account for the year 1885; but would pay 1 per cent. each for 1886 and 1887, 2 per cent. each for 1888 and 1889, and thereafter not less than 5 per cent. annually, and a greater sum should the company so elect; agreeing further, to pay the interest regularly when due; with the proviso, however, that the rate on Series F and G should be reduced from 6 to 5 per cent.

"This proposition having, up to the present time, been accepted by over 80 per cent. of the holders, payments of interest have been regularly and promptly made thereunder to such assenting holders.

"During the present fiscal year this company, having paid the final amount of principal and interest of Series B, has acquired title to 2,999 freight cars covered by that trust, at a cost of \$1,187,845.

"The car equipment, which has not been kept up to the standard for several years past, has been put in proper condition, the sum of \$750,341 having been expended in repairs and renewals of freight cars alone, an increase of \$108,658 over last year. The passenger cars have also been well maintained at a cost of \$184,154, as against \$170,204 in the previous year, an increase of \$13,950.

CONTRACTS AND LEASES.

"The contract with the Delaware & Hudson Canal Co. having expired by limitation, a new agreement was entered into on April 7, 1885, to continue in force for the period of five years, subject, however, to termination by either party before that time at the end of two years' notice. It embraces largely the features of the old one, with a reduction, however, of the rate of trackage to be paid by the Canal Co. on the Jefferson Branch.

"An agreement was also made with the Delaware & Hudson Canal Co., whereby this company was released from the payment of interest which it has heretofore made to that company under its guarantee of Boston, Hartford & Erie bonds. The amount thus annually saved to your company is \$50,908, and only that portion of interest accruing from Oct. 1, 1884, to April 7, 1885 (the date of the agreement), has been paid during the present fiscal year.

"A contract has also been made with the Lehigh & Hudson River Co. for the interchange of freight and passenger traffic at Greycourt. This line extends from Greycourt to Belvidere, and its ore, coal and milk trade has thus been secured to your company.

"Under the terms of the lease, dated Aug. 1, 1880, this company agreed to pay as rental for the Buffalo & Southwestern Railroad the yearly sum of 35 per cent. of the gross earnings of the property. Your board, believing that the provisions of the contract with regard to the amount of rental to be paid were onerous to this company, entered into negotiations with the representatives of the Buffalo & Southwestern Railroad looking to a modification of the same, and after much delay an agreement was reached (which is to remain in force for two years from July 1, 1885), reducing the amount of rental from 35 to 27½ per cent., this company agreeing that if such percentage is not equal to the interest (\$90,000 per annum) upon the bonds of the Buffalo & Southwestern, it shall make the amount good.

COAL COMPANIES.

"Allusion has been made in former reports to the investments of this company in various coal companies. Your company is the owner of the entire capital stock of the Hillside Coal & Iron Co., the Northwestern Mining & Exchange Co., the Towanda Coal Co., and the Blossburg Coal Co. The company first mentioned is situated in the anthracite coal region, and the latter companies have valuable mines in the bituminous districts. The coal used upon the New York, Lake Erie & Western Railroad proper has been taken entirely from the mines of the companies named, at a minimum cost (not being subject to any commissions or dealers' profits), and has been regularly charged in the operating expenses of this company. In addition to the coal thus taken by your company, moderate quantities have been mined for the general trade and sold at a fair rate of profit. The coal is of excellent quality, the quantity is enormous, and at a comparatively small expense for additional breakers large returns can be secured from these investments in future."

CONNECTING LINES.

The report here refers at length to the litigation over the Cincinnati, Hamilton & Dayton road, the progress of which

we have noted from time to time, and which has, so far, resulted in favor of the Erie. It continues:

"As the results of this controversy, to which undue importance was publicly given by those who desired to injure your company, the Cleveland, Columbus, Cincinnati & Indianapolis Railway Co. came forward and offered much better terms for the service between Dayton and Cincinnati, and a contract has been made which will shortly be put into operation. In addition to the better terms thus secured, the advantage was obtained of receiving and delivering our passengers to and from Cincinnati, and beyond, in the Union Depot in Cincinnati, instead of conveying them in omnibuses from and to the remote and isolated station of the Cincinnati, Hamilton & Dayton Railroad.

"While these events were occurring, your board disposed of 2,500 shares of the stock of the Cincinnati, Hamilton & Dayton Co. which it had acquired at the time the contracts were made, and applied the proceeds thereof in liquidating, to that extent, the floating debt of this company.

"Another connecting road, to which reference has been made in former reports of the officers of this company, is the Chicago & Atlantic Railway. The benefits which seem to have been expected to result to the Erie system from the building of that line of road have not been realized. Large sums of money were advanced to the Chicago & Atlantic for purposes of construction without compensating advantages to the Erie Co., as results so far have shown. Notwithstanding the assertion that the Chicago & Atlantic was practically an extension of the Erie system to the city of Chicago, and that the road was to be under the control of the Erie Co., this company is now, and has been for nearly a year past, without voice or influence in the management of that company or the conduct of its business. The relations of the two companies are now the subject of disagreement and litigation. In May last, the Chicago & Atlantic Co. brought suit against the company and the New York, Pennsylvania & Ohio, charging in substance the diversion of traffic from the Chicago & Atlantic to which it claimed to be entitled under certain alleged contracts between the three companies, and the withholding of large sums of money due the Chicago & Atlantic. Upon application to the Court, without notice to the defendants, and upon *ex-parte* affidavits, an injunction was obtained restraining this company and the New York, Pennsylvania & Ohio from diverting traffic from the Chicago & Atlantic to which it was entitled under the alleged agreements, and further restraining the defendants from retaining moneys received by them in prepayment of freight charges, and from sales of passenger tickets over the Chicago & Atlantic. This company moved for a vacation of the injunction, and presented affidavits showing that the Chicago & Atlantic had itself violated the alleged agreements by diverting east-bound traffic to other lines than the Erie. Full argument before the United States Circuit Court resulted in a substantial victory to the defendants; the Court holding that the injunction as to the New York, Pennsylvania & Ohio should be vacated, and as to this company it should be vacated, except so far as to enjoin the Erie from diverting freight delivered to it for transportation over the line of the Chicago & Atlantic, to which no reasonable objection can be made. This decision was rendered early in July, and since that time no further steps have been taken by the plaintiff in the suit. Other suits growing out of the alleged agreements between this company and the Chicago & Atlantic are now pending, and the interests of this company therein are in the hands of counsel.

CONCLUSION.

"The year has been marked by very great and general depression in the commercial and industrial interests of the country. Your company could have borne without serious injury its share of the loss resulting from the decreased volume of traffic, had it been possible to maintain at a fair and moderate standard the rates for local and through business.

"The complications arising from the construction of the New York, West Shore & Buffalo road, and the building of the Western Extension of the Delaware, Lackawanna & Western line, culminated during the year in the most stubborn and severe contest ever known in the history of American railroads.

"It was impossible to confine this warfare to the companies most actively engaged therein. The whole freight and passenger traffic of the Trunk Lines and their western connections became ultimately involved, and your company was forced in many cases to meet the reduced rates of its competitors, or allow much of its hitherto valuable business to be diverted. In some instances it was obliged to withdraw from the competition, the violence of the contest necessitating the making of rates below the actual cost of transportation. Rates were made on grain from Chicago to New York as low as 8 cents per 100 lbs., out of which had to be deducted, for the cost of transfer in New York harbor, 3 cents per 100 lbs., making a net rate of about 1 mill per ton-mile.

"It was apparent at the beginning of this administration that great reductions in gross receipts would necessarily result from the conditions above referred to, and equally clear that considerable losses in net result would ensue.

"The great problem in railroad management now presented itself in the most distinct and positive form, namely: How to reduce expenses, in a great degree fixed and rigid, in the face of such diminished revenues resulting from the depression in general business, and the existence of the lowest rates for through and local business ever known. The only hope, in the effort to rescue your company from its great and imminent peril, was to adopt a policy of retrenchment and reform, and apply it fearlessly and absolutely in every branch of the service.

"Sinicures were abolished, superfluous men removed, exorbitant salaries reduced, and a direct responsibility enforced, all of which, with the further exercise of the utmost economy at all points, resulted in the enormous reduction of \$2,010,561 in the operating expenses of the company, as compared with the previous year.

"Had this been accomplished at the expense of the physical condition of the property, it would have been false economy; the track, the car equipment and locomotive power are in better condition than at the beginning of the year.

"It must be regarded as quite satisfactory, in reviewing the operations of the past year, to know that under circumstances so difficult, extraordinary and so highly discouraging, your company was able to earn sufficient to pay in full all the rentals of its leased lines and all fixed charges except the interest on the second consolidated bonds, upon which, however, nearly 2 per cent. was earned.

"The outlook has certainly greatly improved. The material interests of the country are in much better condition, thus insuring a larger volume of business.

"The Trunk Lines, acting in harmony with their connecting and affiliated western roads, and with a view to serving the best interests of the public, are maturing plans to obtain fair and moderately remunerative rates, which shall be uniform to all shippers on local as well as through business.

"If this can be accomplished, of which there is every prospect, there can be no doubt that, with the increase of earnings thus secured, and a continuance of the exact system of economy adopted, your company will earn regularly, hereafter, at least its entire fixed charges and rentals of leased lines."